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Comparative Determination of Serobiochemical Constituents In-Door and Free Grazing Camels

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Abstract: Serum concentrations of metabolites and minerals were compared in indoor and free grazing camels. Glucose, triglycerides, cholesterol, immunoreactive insulin and blood urea nitrogen concentrations were significantly higher in indoor than in free grazing camels. Serum Mg and K were significantly higher in free grazing compared to indoor camels. Non-esterified fatty acids concentrations were higher in serum free grazing suggesting that supplementry feeding should be considered in these animals.

Key words: Camel, biochemical constituents, indoor, free-grazing, comparative concentrations

INTRODUCTION

The camel is an important animal in Arabian culture and for various reasons, camels are now transformed from the position of subsistance to one of production (FAO, 1995). The camel in this part of the world was in the past mostly selected for survival to feed the nomads. Camels donot systematically graze on one spot but usually only takes one or 2 bites before moving on, therefore donot destroy pasture (Kanoses, 1977). Due to settlement of many Bedowins, draught or shrinking of grazing land the methods of camel keeping are now fast changing (Mokhtar and El-Hisanonein, 1998) and camel farms are now growing in many parts of Saudi Arabia.

Investigations determining normal values of blood constituents in camels are limited and the way they are affected by nutritional status and other factors seem to be limited (Hassan *et al*., 1968; Eldirdiri *et al*., 1987; Abdalla *et al*., 1988).

Comparison of blood values under different managemental systems seems to be essential as these values may reflect the well-being of the animal and could be used as diagnostic tools in health and disease of animals.

The objective of this study, was to compare some blood constituents in grazing and in-door camels.

MATERIALS AND METHODS

Animals: A total of 105 blood samples were obtained from 2-3 years old male and females, which were naturally grazing in Al-Ahsa area (area extending from Kheras to Salwa, 40000 km^2). The predominant pasture plants were *Haloxylon salicornium, Cetenium elegan, ALhagi maurum, Anabasis stefera and Pannicum turgidum* (Gaili *et al*., 2000). A further 110 samples were obtained from indoor camels kept in 6 farms owned by one person. All animals were group-fed and were given concentrate mixture (Table 1), Rhodes grass (*Chloris gayana*) for roughage and water *ad libitum*.

Table 1: Raw materials and composition percentages of concentrate mixture given to camels

Raw materials (%)	
Barley	35-45
Soya bean meal	2-4
Wheat bran	15-20
Maize	20-25
Salt	0.5-1
Drird dates	2-3
Dicalcium hosphate	0.5-1
Premix	0.5-0.8
Composition (%)	
Moisture (max)	13
Crude Protein (min)	12
Digestable Protein (min)	9
Total digestable nutrients (min)	72
Fat (min)	5-6
Calcium (min)	1
Total phosphorous (min)	0.5
Ash (max)	9

Blood samples were centrifuged at 3000 rpm and serum was seperated and stored at -30°C until analysis.

Laboratory analysis: Serum concentrations of metabolites were determined using the Vet Test 8008 autoanalyser (Sanofi animal health Ltd., England) using specific kets. Serum concentrations of minerals were determind using Shimadzu AA6800 Atomic Absorption Spectrophotometer.

Statistical analysis: Data were analyzed by one way ANOVA, using GLM procedure of SAS (Goodnight *et al*., 1986). Student t-test was used to detect significant differences at $p<0.05$.

RESULTS AND DISCUSSION

Serum concentrations of metabolites in camels are given in Table 2. Serum concentration of glucose, cholesterol, immunoreactive insulin and blood urea nitrogen were significantly ($p<0.05$) higher in indoor camels compared to free grazing camels. Non-esterified fatty acids concentrations were signifcantly ($p<0.05$) higher in free grazing camels than in indoor camels. Concentrations of protein and albumin were similar in both groups. Serum minerals in camels are given in Table 3. Magnesum and potassium concentrations were higher in free grazing camels than in indoor camels. Concentration of Na, Ca and P were similar in the 2 groups.

Higher levels of glucose, triglycerides, cholesterol, immunoreactive insulin and blood urea nitrogen in indoor over that of grazing camels indicate that nutritional factor can influence normal values of blood constituents of metabolites (Mokhtar and El-Hisanonein, 1998). Most of these biochemical values obtained were at the upper physiological limit reported elsewhere (Mehrotra and Gupta, 1989; AL-Busadah and Osman, 2001; Al-Suwaigh and AL-Suhaimi, 2005; Mohammed *et al*., 2007). Rich source of sugars like dried dates may explain the significant increase of serum glucose concentrations in indoor compared to free grazing camels. High intake of grain containing carbohydrate in indoor camels would expected to increase propionate, the most potent stimulus for production of insulin reflected in the increase of immuno-reactive insulin in this group compared to grazing group (Rabelo *et al*., 2001; Shingu *et al*., 2001; Sako *et al*., 2007). As a result of greater amount of concentrate diet supplementation in indoor camels triglycerides, cholesterol and blood urea nitrogen concentrations were also expected to increase (Sako *et al*., 2007). The higher values for serum K and Mg in free grazing camels compared to indoor camels could be due to the reason that the free grazing camels graze an plants rich in these minerals.

Serum concentration of Ca, Na and P obtained in this study were similar to those obtained by Haroun *et al*. (2000) and Mohammed *et al*. (2007). The lower non-esterified fatty acids values in the supplemented indoor camels may indicate that animals in this group were able to draw most of the requierd energy from diet and there was little need for catabolizing endogenous source. On the contrary, the higher non-estrified fatty acids concentrations seen in free grazing camels would suggest that supplementary feeding should be considered during times when pasture conditions are inadequate.

Table 2: Mean (±SD) serum concentration of metabolites indoor and free grazing camels

Parameter	Indoor camels	Free grazing camels
Glucose (mg dL^{-1})	130.20±5.11	105±4.2*
Total protein (mg dL^{-1})	6.85±0.11	6.62±0.12
Albumin (mg dL^{-1})	3.31±0.12	3.21±0.11
Cholestrol (mg dL^{-1})	82.1±2.1	60.5±1.6*
Triglyceride (mg dL^{-1})	95.4±1.6	60.2±0.95*
Creatinin (mmol L^{-1})	0.42±1.6	0.36±0.05
Blood urea nitrogen (mmol L^{-1})	5.6±0.21	3.1±0.11*
Immunoreactive Insulin (Pmol L^{-1})	460±11	220±6*
Non-esterfied fatty acids (μmol L^{-1})	0.32±0.03	0.52±0.06*

*$p<0.05$

Table 3: Mean (±SD) serum concentration of some minerals in indoor and free grazing camels

Parameter	Indoor camels	Free grazing camels
Na (mmol L^{-1})	161±12	146±11
K (mmol L^{-1})	4.2±0.21	6.8±0.31*
Ca (mg dL^{-1})	9.9±0.52	10.2±0.49
P (mg dL^{-1})	0.36±0.02	0.37±0.02
Mg (mg dL^{-1})	0.123±0.011	0.311±0.012*

*$p<0.05$

CONCLUSION

This study concluded that although some of nutrients were available in natural pasture, but supplementry feeding should also be considerd.

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