

Seasonal effects on the levels of some minerals of Iraqi one- humped females camels (*Camelus dromedarius*)

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Abstract

Twelve Iraqi one-humped female camels (*Camelus dromedarius*) of 7- 8 years old presented in the Animal Farm, College of Veterinary Medicine, University of Anbar were used in this study during the period of 1/9/2012 to 1/1/2013. The study were designed to find out the effect of season of year on the levels of some minerals. The results showed there is no significant effects of months on Calcium and Potassium. The results also showed that Phosphorous and Sodium were increased during September ($P<0.05$) and decreased in other months. Magnesium was increased significantly ($P<0.05$) during December ($P<0.05$) as compared with other months. In Conclusion, there are variation between the present findings and those from previous studies that may be attributed to the season or months.

Keywords: Camel, minerals, months.

تأثير الأشهر على مستويات بعض المعادن في إناث الابل وحيدة السنام العراقية

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المستخلص

استخدمت في هذه الدراسة اثنا عشر أنثى من الجمال العراقية وحيدة السنام بعمر 7-8 سنة تواجدت في حقل كلية الطب البيطري، جامعة الأنبار، خلال الفترة من الأول من أيلول 2012 إلى الأول من كانون الثاني 2013. صممت هذه التجربة لمعرفة تأثير بعض أشهر السنة على مستويات بعض المعادن في دم الابل. أظهرت النتائج عدم وجود تأثير معنوي للأشهر على الكالسيوم والبوتاسيوم. كما أظهرت النتائج أن مستويات الفسفور والصوديوم كانت مرتفعة ($P<0.05$) خلال شهر أيلول وانخفضت خلال الأشهر المختلفة. كان المغنسيوم مرتفعاً ($P<0.05$) خلال كانون الأول مقارنة بالأشهر الأخرى. نستنتج من الدراسة أن هنالك تباين بين النتائج الحالية ونتائج الدراسات السابقة والذي يمكن أن يعزى إلى تأثير الموسم وأشهر التقييم.

الكلمات المفتاحية: إبل، معادن، الأشهر.

Introduction

The dromedary camels adapted themselves to the ecosystems of dry and arid zones where they are subjected to harsh conditions in addition to the severe fluctuations in the nutritional status, which in turn affect their general performance (16). The camel possesses unique features which make it superior to other domesticated animals in the hot and arid desert ecosystems. This is reinforced by the ability of camel to traverse considerable distances with much less effort than other species, moving from one patch of short-lived vegetation to another. Camel physiology and special features are therefore not only of a scientific interest, but are the basic substance for people who live in marginal dry land areas (3).

The macronutrients are calcium, phosphorus, sodium, potassium, magnesium (6). They are not synthesized in the body but obtained from feed. Herbivores under natural grazing obtained their minerals from forage plants. Inadequate mineral intake leads to reduced productivity (12). The present study aimed to investigate the effect of season on the levels of some minerals parameters in the one-humped camel.

Materials and Methods

This study was conducted at the Animal Farm, College of Veterinary Medicine, University of Anbar during the period from September, 2012 to January, 2013. This experiment included 12 multiparous, non-lactating Iraqi one-humped female camels (*Camelus dromedarius*) of 7- 8 years old and average body weight of 450-500 kg. Animals were daily fed per head of 4 kg green roughages (alfalfa, barley and sorghum), 10 kg of alfalfa hay and 0.5 kg of barley grains (10). Blood sample (10 ml) was collected via jugular vein with heparinized vacutainer tubes.

The blood samples were analyzed for Calcium, Phosphorous, Sodium, Potassium and Magnesium, by spectrophotometrically, APLI. The kit was provided by SPINREACT,S.A./S.A.U. Ctra.Santa Coloma, 7 E-17176 SANT ESTEVE DE BAS (GI) SPAIN. The assay was undertaken at Al-Nadhaer Clinical Laboratory, Baghdad.

Statistical analysis: The data were presented as means \pm S.E. and subjected to analysis by using one way of analysis (ANOVA) post hoc test was used LSD to specify the significant difference among means (14). The software package IBM SPSS program, version 20 was used for the analysis of data

Results

The results of this study are shown in table (1). There is no significant effects of different months on Calcium and Potassium. The significantly ($P<0.05$) in the mean Phosphorous concentration during high during September (6.61 ± 0.22 mmol/l) and during November, December and October (5.86 ± 0.14 , 5.40 ± 0.18 and 5.10 ± 0.46) mmol/l respectively, as depicted in table (1) the mean Sodium concentration was 164 ± 58 3.45, 157.34 ± 2.58 and 152.25 ± 2.20 mmol/l during December, November and October respectively. Where as the level increased significantly ($P<0.05$) to (183.58 ± 3.12) mmol/l in September. The highest Magnesium concentration was recorded

during December (1.78 ± 0.02 mmol/l) and decreased during September, November and October (1.70 ± 0.07 , 1.57 ± 0.04 and 1.54 ± 0.08) mmol/l respectively.

Table (1) The levels of some minerals parameters of Iraqi one- humped females camels (*Camelus dromedarius*)

Month	Calcium (mmol/l)	Phosphorous (mmol/l)	Sodium (mmol/l)	Potassium (mmol/l)	Magnesium (mmol/l)
September	9.57 ± 0.12 a	6.61 ± 0.22 a	183.58 ± 3.12 a	4.09 ± 0.28 a	1.70 ± 0.07 b
October	9.50 ± 0.14 a	5.10 ± 0.46 b	152.25 ± 2.20 c	4.40 ± 0.30 a	1.54 ± 0.08 c
November	9.36 ± 0.12 a	5.86 ± 0.14 ab	157.34 ± 2.58 c	4.29 ± 0.09 a	1.57 ± 0.04 c
December	9.56 ± 0.09 a	5.40 ± 0.18 b	164.58 ± 3.45 b	4.52 ± 0.10 a	1.78 ± 0.02 a

(Mean \pm S.E)

Different superscripts within each column showed significantly difference ($p < 0.05$).

Discussion

In this study, the effect of different seasons of the year and months on minerals parameters was significant. The non-significant difference in Calcium during different months is in agreement with those reported by (13), but not agreed with results obtained by (3); (9); (2) and (4).

Phosphorous was significantly ($P < 0.05$) higher during September than that the November, October and December months. These results disagree with those reported by (3) and (2).

Calcium and phosphorus are closely associated in metabolism. In mammals the major portion of calcium in the diet is used for bone formation. Calcium also is essential for clotting of the blood, is required along with sodium and potassium for the normal beating of the heart, and is concerned in the maintenance of acid-base balance. In addition to its role in bone formation, phosphorus has important functions in the metabolism of carbohydrates and fats, it enters in the composition of important constituents of all living cells, and salts formed. It plays an important part in the maintenance of acid-base equilibrium (17).

Sodium level in the current study are similar to that reported by (9) and (2), but not in agreement with those obtained by (13).

Sodium ions, mainly extracellular are important in maintaining osmotic pressure, acid-base balance and membrane potential. Sodium and water metabolism are closely related, and in the camel as in other mammals are controlled by aldosterone, rennin-angiotensin, antidiuretic hormone and atrial natriuretic peptide (19, 8). Camels in their natural habitat are exposed to dehydration (19, 7) salty bushes or salty water (17) and are well adapted to it. The camel kidney is adapted for sodium and water reabsorption and hence the ability to concentrate urine (1).

The non-significant effect of month on the Potassium in the present study confirmed the results obtained by (2).

In dehydrated camels the tissue potassium content increases (5) while the glomerular filtration and excretion of potassium decreased simultaneously. The metabolism of potassium depends on aldosterone which promotes its excretion in tubular sodium reabsorption with exchange. However, in dehydrated camels where the action of aldosterone is low, it seems that DHA modulate this metabolism. After rehydration, the plasma concentration of potassium decreases, its tubular excretion increases in exchange with sodium (18).

Magnesium was significantly ($P<0.05$) higher during December than September, November and October month. These results disagree with those reported by (2).

Magnesium is widely distributed in the body, about half of the body Mg is in the bone at concentration of 0.5-0.7 % of the bone ash (15). Magnesium in soft tissues is concentrated within the cell, the highest concentration is in the liver and skeletal muscles. 75% of blood Magnesium is in the red blood cells and 25% in serum (6). Magnesium is required for normal skeleton development as a constituent of bone. It is required for oxidative phosphorylation reaction in the mitochondria. It is also required for activation of enzymes in reactions involved in ATP utilization (11). Magnesium also acts as a co-factor in decarboxylation reactions and is required for activation of certain peptidases (15).

It was concluded from this study that minerals of blood (Phosphorous , Sodium and Magnesium) in Iraqi female one- humped camel showed a high variations because the heat stress between months of study .

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