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Short Communication

TRACE MINERAL PROFILES OF CAMEL BLOOD AND SERA

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According to Radostits *et al* (2000), at least 15 mineral elements are nutritionally essential for ruminants which include trace elements like Cu, Se, Zn, Co, Fe, I, Mn and Mo in addition to macro minerals like Ca, P, K, Na, Cl, Mg and S. The trace elements are involved as component parts of many tissues, and one or more enzyme activities and their deficiency leads to wide variety of pathological consequences and metabolic defects. Anomalies in trace element supply can influence growth, reproductive performance or immuno-competence of livestock. It is speculated that trace element deficiencies are wide spread, but their incidence and importance are probably underestimated because subclinical forms of deficiency can occur and go unnoticed for prolonged periods.

The strategies for anticipating and preventing trace elements deficiencies include regular analysis of feed and soil, which are not highly reliable and monitoring samples from herds and flocks to prevent animals from entering the zone of marginal trace element deficiencies which precedes the onset of functional deficiency. The diagnosis of mineral deficiencies, particularly trace element deficiency will depend heavily on the interpretation of the biochemical criteria of the trace element status. This study on mineral profiles of blood of camel was carried out with a view to establish the normal values of trace elements of Cu, Co, Fe and Zn in camel blood and sera in this arid zone.

Materials and Methods

The study was conducted on institute herd, and some sera samples, which were also borrowed from field camels. Blood samples were harvested by jugular venepuncture in heparinised polyproylene tubes from adult female camels in Jaisalmeri, Bikaneri and Kachchi breeds. 5 ml of blood was mixed with equal volume of nitric acid in kjeldhal digestion tube. The samples were kept overnight at room temperature and then heated over digestion bench using low heat below 90°C. When the volume of the samples was reduced to 0.5 ml it was cooled and 5 ml of double acid mixture containing 3 parts of nitric acid and 1 part of 70% perchloric acid was added to it. The samples were again transferred to digestion bench for slow digestion. This procedure was repeated till white fumes emanated and the volume was reduced to 0.5 ml. The digested samples were cooled and diluted to 50 ml with distilled water. Limited number of sera samples were also digested in similar way. Mineral concentration was estimated using AAS 4141 of ECIL, Hyderabad, India.

Results

Mineral concentrations in blood of adult male and female camels of 3 breeds have been presented in table 1 and 2 and mineral composition of serum samples have been given in table 3. The blood and sera concentration of copper and cobalt did not vary much but iron and zinc concentration of blood is several fold higher than serum.

Table 1. Mineral profiles of blood from male camels of Jaisalmeri, Bikaneri and Kachchi breed.

Breed	Fe (µg/ml)	Zn (µg/ml)	Cu (µg/ml)	Co (µg/ml)
J	70.33 ± 1.96 (53.9 - 84.2) (n = 21)	10.25 ± 0.47 (5.9 - 13.4) (n = 21)	1.31 ± 0.06 (0.9 - 1.9) (n = 21)	0.43 ± 0.04 (* - 1) (n = 21)
B	69.07 ± 4.19 (53.8 - 92.8) (n = 11)	9.9 ± 0.55 (7 - 11.9) (n = 11)	0.99 ± 0.21 (0.1 - 1.9) (n = 11)	0.29 ± 0.05 (0.1 - 0.6) (n = 11)
K	72 (69.2 - 74.8) (n = 2)	6.6 (n = 2)	1.05 (0.9 - 1.2) (n = 2)	0.4 (n = 2)

* = Undetectable, J = Jaisalmeri, B = Bikaneri, K = Kachchi

Discussion

The values reported in the present study are for whole blood as well as sera, while those reported elsewhere are for serum or plasma. We have found

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Table 2. Mineral profiles of blood from female camels of Jaisalmeri, Bikaneri and Kachchi breed.

Breed	Fe (µg/ml)	Zn (µg/ml)	Cu (µg/ml)	Co (µg/ml)
J	80.0 ± 5.01 (39.9 - 93.9) (n = 12)	10.13 ± 0.43 (6.5 - 12.0) (n = 12)	0.52 ± 0.08 (0.2 - 1.1) (n = 12)	0.12 ± 0.02 (* - 0.2) (n = 12)
B	73.22 ± 2.54 (45.6 - 87.8) (n = 20)	10.28 ± 0.51 (5.7 - 12.4) (n = 20)	0.53 ± 0.07 (* - 1) (n = 20)	0.12 ± 0.02 (* - 0.4) (n = 20)
K	79.7 ± 2.38 (64.8 - 90.5) (n = 12)	9.95 ± 0.56 (6.1 - 12.2) (n = 12)	0.70 (0.6 - 1.0) (n = 12)	0.14 ± 0.03 (* - 0.4) (n = 12)

* = Undetectable, J = Jaisalmeri, B = Bikaneri, K = Kachchi

Table 3. Mineral profiles of serum from female camels from fields.

Fe (µg/ml)	Zn (µg/ml)	Cu (µg/ml)	Co (µg/ml)
3.21 ± 0.35 (n = 33)	1.89 ± 0.11 (n = 33)	1.4 ± 0.05 (n = 33)	0.93 ± 0.07 (n = 33)

that copper and cobalt profiles do not differ much between serum and whole blood, but, there are significant differences in respect to iron and zinc, and this might have been due to association of these elements with cells as for example, haemoglobin of RBCs is expected to contain large amount of iron. Values reported by Damir (1998) for levels of copper, zinc, and iron in camel blood plasma citing several studies are much higher than observed in present study. The author has reported these values in mg/dl, whereas our study indicates that the values should be in µg/ml.

It is expected that the data generated during this study will serve as baseline for future studies in camel on pathophysiology of mineral nutrition in camel.

References

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