



Biochemical and trace mineral profile in post-parturient dromedary camel (*Camelus dromedarius*)

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The genetics, physiology, nutrition and environmental conditions influence the various biochemical parameters hence it is necessary to establish the normal reference values, for each animal species under different environmental and nutritional conditions according to age, sex and physiological conditions (Bogin 2000). In camel, the references for trace minerals other than copper, zinc and iron are very few and are non-existent in relation to various physiological conditions in published literature (Faye and Bengoumi 1994). The camel milk and its products are slowly becoming popular and new role of camel as dairy animal is gaining acceptance. Feeding minerals and other nutrients up to requirement is essential to achieve a high level of performance (Abu Damir 1998). The early post-parturient period is very crucial for milk production. The blood biochemical and mineral profile during post-partum period has great relevance to future fertility in dairy animals (Tillard *et al.* 2008). Optimum levels of cholesterol, a precursor of steroid, and protein are also necessary for the normal reproductive development. Calcium and phosphorus influence the ability of animals to utilize other trace elements. Their influence on certain enzyme system may affect reproductive efficiency. There is lack of information concerning the regulation of Ca and Mg concentrations in blood in camel (Barri *et al.* 2005). Therefore the present study was conducted to know the status of trace minerals (Ca, P, Cu, Co, Fe, Zn, Mg, Mn), cholesterol and total proteins in the post-parturient female camels, which may be useful as baseline information in this species.

Post partum dromedary camels (21) belonging to the herd of the centre were used. The females were mated by a fertile

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male between 35–40 days post-partum as successful unorthodox mating during post parturient period was reported previously (Vyas and Sahani 2000). Blood samples were collected from all 21 animals on the day of mating, serum was separated and stored at –20 °C. Blood samples (7) were collected on second mating given at 60 days post-partum to some animals. Serum concentration of calcium, zinc, iron, copper, magnesium and manganese were determined by atomic absorption spectrophotometer. Total protein was estimated using standard diagnostic kit. Inorganic phosphorus was also estimated using standard diagnostic kit. The pregnancy was confirmed by rectal palpation at 60 days post-mating. The mean values of each parameter were calculated and subjected to t-test (Panse and Sukhatme 1967) to determine the difference between pregnant and non-pregnant camels out of post-parturient breeding.

The serum-biochemical and macro-micro minerals in post-partum dromedary camel are shown in Table 1. No significant difference was found between the values in pregnant and non-pregnant camels unorthodoxly bred during the early post-partum period. Iron and phosphorus levels were higher in pregnant than non-pregnant camels but the variation was statistically nonsignificant. The wider Ca: P ratio (3.3: 1) in camels remained non-pregnant in the present study compared to 2.58: 1 in camels conceived out of unorthodox early post-parturient breeding suggests importance of P supplementation in post-partum period to achieve better fertility in post-parturient camels.

The Ca values in the post-parturient lactating camels in the present study are slightly lower than those reported for non-lactating, non-pregnant female (11.0 mg/dl, Saeed *et al.* 2004) and adult female camels (10.48 mg/dl, Barri *et al.* 2005). The P levels in the present study are lower than previous reports i.e. 5.2 mg/dl (Bogin 2000) and 6.6 mg/dl in non-lactating non-pregnant female (Saeed *et al.* 2004). Faye *et al.* (2005) have reported copper levels in lactating camels at deficiency limits (58.9 µg/dl). Therefore the copper

Table 1. Trace minerals and biochemical profile (mean±SE) in postparturient dromedary camel

Samples	Fe (µg/ml)	Zn (µg/dl)	Cu (µg/dl)	Mn (µg/dl)	Mg (µg/dl)	Ca (mg%)	P (µg/dl)	Total protein (g/dl)	Cholesterol (mg/dl)
Pregnant (n=7)	39.46±3.29	161.4±19.0	92.85±6.8	90.0±4.3	3.43±0.08	9.61±0.45	3.72±0.44	5.72±0.47	50.53±8.9
Non pregnant (n=20)	34.72±1.61	193.5±24.2	98.0±3.37	90.5±2.45	3.46±0.06	9.65±0.26	2.93±0.26	5.6±0.19	53.36±5.8
Overall	35.95±1.49	185±18.6	96.66±3.0	90.37±2.1	3.45±0.05	9.64±0.22	3.13±0.24	5.63±0.18	52.59±4.8

t-test revealed no significant difference between camels conceived and not conceived during early; post-parturient period in terms of serum Fe, Zn, Cu, Mn, Mg, Ca, P, total protein and cholesterol.

status in the lactating camels of present study (96.6 µg/dl) can be termed as normal.

A large variation in Zn values (0.2–115 µg/dl) was reported in camels in United Arab Emirates with Zn deficiency (8.9 µg/dl) in lactating camels (Faye *et al.* 2005). The Zn status in post-parturient lactating female camels of present study is higher than the above values. The higher values in the present study may account for the Zn transfer into milk without causing Zn deficiency in dams. A recent study has shown an active transfer of Zn in camel milk (Cattaneo *et al.* 2005).

The values of Fe (35.9 µg/ml) are higher than previous report (110–152 µg/dl, Shekhawat *et al.* 1987) but lower than those reported by Bogin 2000 (60–130 µg/ml). The reported Mg values are similar to the values reported by previous workers (2.4 mg/dl, Bogin, 2000; 3.54 mg/dl in adult female camels, Barri *et al.* 2005). The Mn values are higher than previous report (0.29 µg/dl in UAE, Faye *et al.* 2005). The mean values of cholesterol in the present study are higher than previous report (40.2 mg/dl in non-lactating female Saeed *et al.* 2004). The values of total protein in the present study are slightly lower than those reported previously for non-lactating female (6.1 g/dl, Saeed *et al.* 2004).

The present findings may serve as reference values for biochemical and trace mineral profile in post-parturient camel. The results also suggest importance of phosphorus supplementation for fertility improvement in post-parturient dromedary camel.

SUMMARY

The present study was conducted to evaluate the biochemical and trace mineral profile in post parturient dromedary camel. The serum iron (Fe), zinc (Zn), copper (Cu), manganese (Mn), magnesium (Mg), calcium (Ca), phosphorus (P), total protein (TP) and cholesterol were 35.95±1.49 µg/ml, 185±18.6 µg/dl, 96.66±3.0 µg/dl, 90.37±2.1 µg/dl, 3.45±0.05 mg/dl, 9.64±0.22 mg/dl, 3.13±0.24 mg/dl, 5.63±0.18 g/dl and 52.59±4.81 mg/dl respectively. No significant difference was found in serum iron, zinc, copper, manganese, magnesium, calcium,

phosphorus, total protein and cholesterol content between camels conceived and not conceived from breeding in early post-partum period. The Ca: P ratio was wider in non-pregnant (3.3: 1) than pregnant camels (2.5: 1).

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