International Journal of Basic and Applied Sciences Vol. 4. No. 1 2015. Pp. 1-4

Full Length Research Paper

A Study on Serum Proteins of Camel *(Camelus dromedaries)* maintained on Different Diets

Rakesh Poonia*, Aakash Srivastava,*** Suchitra Sena** and Meera Srivastava*
*Post-Graduate Department of Zoology, Govt. Dungar College, Bikaner 334001, Rajasthan, India.
**National Research Centre on Camel, Bikaner, 334001, Rajasthan, India.
*** SP Medical College, Bikaner, 334001, Rajasthan, India.

*Corresponding Author: Meera Srivastava

Abstract
The camel Camelus dromedarius, is an important livestock species uniquely adapted to hot and arid environment. Dicotyledons are amongst the preferred plants by camel. Cluster bean (guar) is an important drought resistant leguminous crop most suitable in arid areas. Camels, under conditions of scarcity of grazing, especially in summer, are fed roughages and concentrates. The proportion of the concentrate and roughage in the complete ration is expected to change the microbial population in the rumen, which in turn may affect their capacity to colonize feed particles and may influence the nutrient utilization from the feed. In developing countries like India where economy is growing, the supply of well established diet to the cattle is not possible for poor animal holders especially to the camel because it needs so much dry matter and concentrate to fulfill its daily feed requirements. So common keepers most often do not feed concentrate to their camels unless they become rundown. In that case they feed some millet flour or barley flour and gur (molasses) 1g/kg body weight for a few days till the camel regains his condition. If this molasses is given in excess amount, it causes gastro-intestinal disorders. These have been used widely to identify problem and to indicate dietary causes of diseases or low production. Due to introduction of new feed resources, this study was an attempt to investigate the serum proteins of camels maintained on different diets. Group 1 camels were given guar phalgati (Cyamopsis tetragonaloba) and ground nut (Arachis hypogaea) chara in 1:1 ratio. Group 2 camels were given ground nut chara alone while in Group 3 camels jaggery 50%w/v was administrated as a single dose orally @15g/kg body weight apart from feeding of ground nut chara. There was a significant change (P<0.01) in the protein levels among Group 1 and 2 and Groups 2 and 3. The concentration of protein was also in the normal range but the mean levels were higher in Group 3 followed by Groups 1 and 2 and it could be envisaged that there exists a significant role of diet pattern on protein profile.

Key words: *Camel, diet, serum proteins, albumin, globulin, A: G ratio*

Introduction

The camel *Camelus dromedarius*, is an important livestock species uniquely adapted to hot and arid environment. Although camelidae are ruminating animals, they are classified as pseudo-ruminants because they differ from true ruminants in structure of their compound stomach. The camelid stomach is considered two-chambered, with a fore stomach (comprising the reticulo-rumen) and a tubular stomach. The most striking feature differentiating it from the appearance of the true ruminant stomach is the presence of glandular sacs. Rumen fermentation can supply 70-100% of ruminant animals amino acid supply and 70-85% of the energy supply can be absorbed as volatile fatty acids, the main end product of microbial fermentation. Dicotyledons are the most preferred feed of camel and more than 70% and often as much as 95% of the total feed selected by this animal comprises of the same. Cluster bean (guar) is an important drought resistant leguminous crop most suitable in arid areas. An appreciable amount of edible biomass is obtained as waste or byproduct after screening of seeds popularly known as guar phalgatti which includes stem and empty pods of the plant. Camels, under conditions of scarcity of grazing, especially in summer, are fed roughages and concentrates. Dry roughages consist of bhoosa (straw), tree leaves and pods collected in rainy season. Bhoosa (straw) is chaffed into small pieces. Chaffed grass mixed with straw of one or two different crops is also used for feeding camels. The proportion of the concentrate and roughage in the complete ration is expected to change the microbial population in the rumen, which in turn may affect their capacity to colonize feed particles and may influence the nutrient utilization from the feed. The nutritional value of feed is influenced by the feed characteristics, and their influence on rumen microbial characteristics, knowledge of both, and their interaction can contribute to a better understanding of the nutritional qualities of ruminant feedstuffs.

In developing countries like India where economy is growing, the supply of well established diet to the cattle is not possible for poor animal holders especially to the camel because it needs so much dry matter and concentrate to fulfill its daily feed requirements. So common keepers most often do not feed concentrate to their camels unless they become rundown. In that case they feed some millet flour or barley flour and gur (molasses) 1g/kg body weight for a few days till the camel regains his condition. If this molasses is given

in excess amount, it causes gastro-intestinal disorders. The rumen fluid profiles can be considered important in evaluating the health status of animals. These have been used widely to identify problem and to indicate dietary causes of diseases or low production. Due to introduction of new feed resources, this study was an attempt to investigate the effect on serum proteins of camels maintained on different diets.

Materials and Methods

The present investigation was carried out in three groups of four camels each, at National Research Center on Camel, Bikaner, maintained on different diets. Group 1 camels were given guar phalgati (*Cyamopsis tetragonaloba*) and ground nut (*Arachis hypogaea*) chara in 1:1 ratio. Group 2 camels were given ground nut chara alone while in Group 3 camels jaggery 50%w/v was administrated as a single dose orally @15g/kg body weight apart from feeding of ground nut chara. In all the three groups de-worming was done with a broad spectrum anti-helminthes prior to the start of the experiment and all the camels were in clinically healthy condition. All three groups of camels were given ad lib water.

Protein estimation

Method

Protein estimation was done by method given by Lowry (1951).

Reagents

1. **Standard solution of bovine serum albumin (0.06% BSA)**

It was prepared by dissolving 0.06 g BSA in 100 ml of distilled water.

2. **Trichloroacetic acid(10% TCA)**

10 g of TCA was added in minimum volume of distilled water and the final volume was made up to 100 ml with the help of distilled water.

3. **Solution -A**

2 g of sodium carbonate was dissolved in 100 ml of 0.1N NaOH solution.

4. **Solution-B**

1 g sodium-potassium tartarate was dissolved in 100 ml distilled water and then 0.5 g copper sulphate was added and kept overnight. After that it was filtered to remove precipitate.

5. **Solution-C**

It was prepared by mixing 50 ml solution A and 1ml of solution B just before use.

6. **Solution-D**

1 ml Folin and Ciocalteu's phenol reagent was mixed in 2 ml of distilled water.

Procedure

Test: 0.1 ml rumen fluid sample was added in 0.4 ml of distilled water.

Standard: 'Standard's of BSA were prepared as follows:

Tube No.	1	2	3	4	5	6	7	8	9
Standard BSA(ml)	0.0	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40
GDW (ml)	0.50	0.45	0.40	0.35	0.30	0.25	0.20	0.15	0.10
BSA(µg)	00	30	60	90	120	150	180	210	240

After preparing of these tubes 5 ml of solution C was added in all tubes and these tubes were incubated for 10 minutes at room temperature and then 0.5 ml of solution D was added and mixed vigorously and absorbance was recorded at 600 nm against blank and protein concentration was calculated with the help of calibration curve of standard BSA solutions. The protein concentration was expressed as mg/dl.

Total protein

The total protein concentration in the serum sample was estimated by kit method which was based on Biuret procedure (Doumas *et al*., 1981).

$$\text{Total protein in serum sample (gm/dl)} = \frac{\text{Absorbance of sample}}{\text{Absorbance of standard}} \times 7$$

where, 7=concentration of standard solution of protein

Serum Albumin

The concentration of albumin in serum was determined by kit method which was based on Bromocresol green procedure given by Doumas *et al*., (1981).

$$\text{Albumin in serum sample (gm/dl)} = \frac{\text{Absorbance of sample}}{\text{Absorbance of standard}} \times 5$$

where, 5 = Concentration of standard albumin solution

Serum globulin was calculated by subtraction (Total Proteins- Albumin)

Results and discussion

Total protein

The mean value of serum total proteins in camels of Group 1, 2 and 3 were 6.79±0.11, 6.15±0.10 and 6.92±0.04 g/dl respectively. The mean values of serum total proteins were high in Group 3, followed by Group 2 and Group 1. The increase in the levels of total serum protein profile between the groups was significant (P<0.01). The result of total serum protein levels in three groups are presented in Table 1 and Fig 1.

Serum Albumin

The mean values of serum albumin in Group 1, 2 and 3 animals were 3.3.±0.04, 3.06 ±0.04 and 3.37±0.01 g/dl. The result indicates that there was no significant variation in albumin level among these groups of animal. The result of albumin concentration is illustrated in Table 1 and Fig. 2.

Serum Globulin

The mean values of serum globulin in Group 1, Group 2 and Group 3 animals were 3.48±0.06, 3.09±0.05 and 3.55±0.02 g/dl respectively. The results show slightly high globulin level in Group 1 in comparison of Group 2 and 3. The result of globulin level is presented in Table 1 and Fig.2.

Serum A: G ratio

The mean values of serum A: G ratio in Group 1, Group 2 and Group 3 camels were 0.94±0.005, 0.98±0.002 and 0.94±0.004 respectively. The results indicate no significant variations among three groups of camels. The result of A: G ratio is presented in Table 1 and Fig. 3.

There was a significant change (P<0.01) in the protein levels among Group 1 and 2 and Groups 2 and 3. The concentration of protein was also in the normal range but the mean levels were higher in Group 3 followed by Groups 1 and 2. In Group 3 camels the changes can be attributed to decreased catabolism of protein. Among the groups, optimum protein levels were seen when camels were maintained on guar phalgati and groundnut chara in comparison to ground nut chara alone, revealing that combination is better. High concentration of serum albumin, globulin and A:G ratio was seen in Group 3 camels in comparison to Groups 1 and 2 during present study and the changes were similar to serum protein levels. Similar observations were also made by Coffman (1979b), Wilson & Gorden (1987), Kumar *et al.,* (2001) and Khafipour *et al*., (2009b). This significant increase in protein profile was suggested to be due to hemo-concentration and uncompensated dehydration by Coffman (1979b) and Wilson & Gorden (1987) which also seemed to be true for the present findings.

Table 1. Serum protein profile (*) in different groups of camels fed with different diets

Parameter	Group-1	Group-2	Group-3
Total Protein(g/dl)**	6.79±0.11[a]	6.15±0.10[a,b]	6.92±0.04[b]
Albumin(g/dl)**	3.3.±0.04[a]	3.06 ±0.04[a,b]	3.37±0.01[b]
Globulin(g/dl)**	3.48±0.06[a]	3.09±0.05[a,b]	3.55±0.02[b]
A :G ratio**	0.94±0.005[a]	0.98±0.002[a,b]	0.94±0.004[b]

**values given are Mean±SE.*
***(P<0.01:significant at 1% level; Figures with similar superscripts reveal significance between groups).*

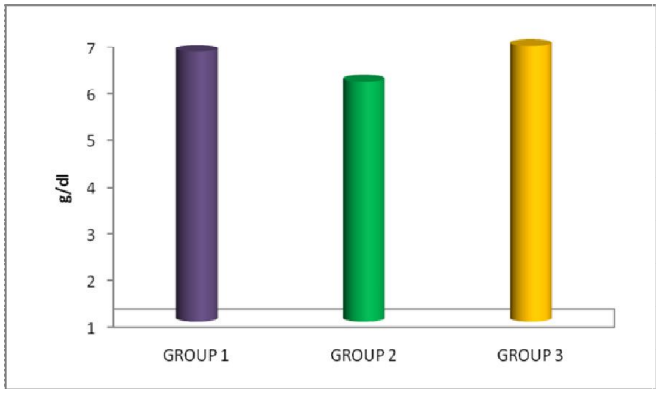

Fig. 1. Mean serum total protein (g/dl) in different groups of camel fed with different diets

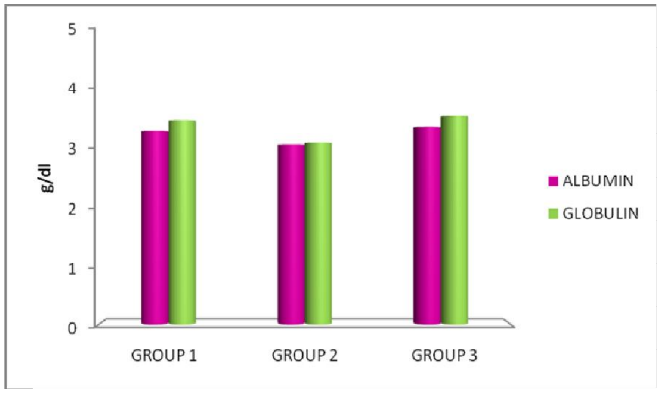

Fig 2. Mean serum albumin and globulin (g/dl) in different groups of camel fed with different diets

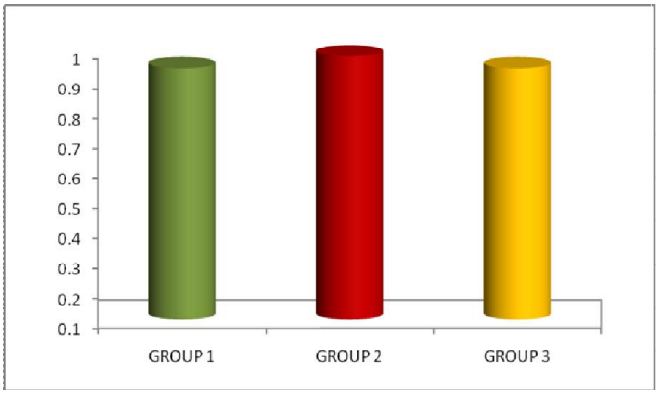

Fig. 3. Mean serum A: G ratio in different groups of camel fed with different diets

Conclusion

There was a significant change ($P<0.01$) in the protein levels among Group 1 and 2 and Groups 2 and 3. The concentration of protein was also in the normal range but the mean levels were higher in Group 3 followed by Groups 1 and 2 and it could be envisaged that there exists a significant role of diet pattern on protein profile.

Acknowledgement

The Principal, Govt.Dungar College, Bikaner and The Director, NRCC, Jorbeer, Bikaner are thankfully acknowledged for providing facilities and extending their co-operation in carrying out this work.

References

Coffman, J. 1979b. Blood glucose 2. Clinical application of blood glucose determination perse. *Veterinary medicine Small Animal, Clin.* **74**:855-858.

Doumas, B.T. et al., 1981. *Clinical Chemistry. 2nd ed*. C.B.S. publishers and distributors. 137-139.

Khafipour, E.,S Kraure,D.O. and Plaizier, J.C. 2009b. Alfalfa pellet induced subacute ruminal acidosis in dairy cows increases bacterial endotoxin in the rumen without causing inflammation. *Journal of Dairy Science.* **92**(4): 1712-1724.

Kumar, A., Gupta, S.L., Varshney, J.P. and Sharma, D.K. 2001. Experimental induction of impaction colic and its analgesic alleviation in donkeys. *Indian Journal of Veterinary Medicine.* **21**(2):61-69.

Lowry, O.H., Rosebrough, N.J., Farr, A.L. and Randall, R.J. 1951. Protein measurement with the Folin-Phenol reagent. *Journal of Biol. Chem.* **193**: 262-275.

Wilson, J. & Gorden, B. 1987. Equine colic: Interpreting the diagnostic test. *Veterinary Medicine*. **82**:629-645.