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Status of Some Chemical and Biochemical Parameters of Camel Blood in the Rainy Season in the Sudan

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Abstract: The activities of Glutamate Oxalo-acetate Transminase (GOT) and Alkaline Phosphatase (ALP) and the concentrations of cholesterol total protein, albumin and bilirubin were determined in the sera of healthy rural camels (Camelus dromedarius) in Butana area in Sudan in the summer (June, 7). The levels estimated were in general agreement with the normal levels reported by other investigators. The same investigations were carried in the sera of rural healthy camels in the rainy season (October, 15) in Butana, significant changes were observed in the estimates of albumin SGOT and ALP.

Key words: Biochemical, chemical, GOT, ALP

INTRODUCTION

Enlargement, change of colour and consistency are common abattoir findings of ruminant livers during the rainy season in the Sudan. More camel livers are condemned during this season in Butana to avoid intoxication by the consumption of the raw product. Waldridge and Pugh[1] reported that extensive investigations performed at Ohio State University of camels affected with liver disease have usually identified causes including malnutrition, parasitism, changes in management environment, feed and water sources and hierarchy structure. Anderson[2] suggested that although serum activity of GPT, ALP and GOT may be elevated in camels with liver disease, these enzymes are inconsistent in the magnitude of elevation relative to the severity of disease and that cholesterol and b-hydroxybutrate are useful indicators of fat mobilization. Ross[3] suggested that the increase in GOT in serum provides a logical procedure for estimating parenchymal liver damage. Kaplan[4] suggested that a combination of liver function tests together with a few selected serum enzyme measurements may provide information for ascertaining the status of the liver. He concluded that a diffuse minimal involvement of the liver may produce a more grossly abnormal laboratory test than would a focal necrosis, the patient may or may not experience pain or feel sick. Cornelius[5] stated that many biochemical functions can be affected before structural changes are observable using any modern techniques.

In view of this, certain serum constituents and comparative enzyme activities, as a liver function profile, were surveyed in clinically healthy camels in the rainy season compared to the normal estimates performed in the summer in the same territory.

MATERIALS AND METHODS

Animals: The animals investigated were as follows:

Summer: 10 camels, *Camelus dromadrius*, Butana type, ranging 4-10 years of age, both sexes with moderate to good state of nutrition.

Rainy season: 26 camels *Camelus dromadrius*, most were Butana type except 5 were Western Sudan types (Greban and Nyala), ranging 1-10 years of age, both sexes, state of nutrition excellent.

The state of health of the camels was assessed from the ante-mortem and post-mortem inspections at the Tambol slaughter House, formal, orderly postmortem reports were issued.

Blood: was collected from jugular vein during slaughter into dry clean bottles[6], sera separated and preserved at 15°C for enzyme assays and other investigations.

Enzyme assays: Glutamate-Oxaloacetate Transminase (GOT) and Glutamate-Pyruvate Transminase (GPT) activities were assayed by the method of Reitman and Frankel[7], serum Alkaline Phosphatases (ALP) were determined by an optimized method according the recommendations of the Deutche Gesellschaft fur Klinisch Chemie.

Table 1: Some normal biochemical parameters of camel blood in Butana-Sudan

No. of camels	Cholesterol (mg dL^{-1})	T. protein (gm 100 mL^{-1})	Albumin (gm/100 mL^{-1})	SGOT (SU mL^{-1})	SGPT (SU mL^{-1})	Alkaline phosphatases (KAU mL^{-1})	Bilirubin (mg 100 mL^{-1})
10	138.1±39.31	7.940±1.362	4.34±0.389	12.70±1.95	7.50±1.65	2.720±0.986	0.140±0.171

Values within a column represent the Mean±SEM

Table 2: Biochemical parameters of camel blood in the rainy season in Butana area-Sudan

No. of camels	Cholesterol (mg dL^{-1})	T. protein (gm 100 mL^{-1})	Albumin (gm 100 mL^{-1})	SGOT (SU mL^{-1})	SGPT (SU mL^{-1})	Alkaline phosphatases (KAU mL^{-1})	Bilirubin (mg 100 mL^{-1})
26	140.88±5.73	7.612±1.104	4.054±0.202*	41.23±15.23*	5.15±5.52	5.946±2.061*	0.112±0.137

Values within a column represent the Mean±SEM, * Shows significance at $p \leq 0.05$

Chemical methods: The total protein contents were estimated by the biuret method[8] bilirubin level were estimated using the Van Den Bergh test[9], cholesterol levels[10] and albumin levels[11].

RESULTS

Animal inspection: the ante-mortem and post-mortem examinations performed in both seasons had shown that the animals were clinically sound. The camels attended in the rainy season were in a generally better nutritional condition exhibiting heavier and more fatty carcasses, the livers being larger, heavier and more fatty.

Normal control values: The results of the enzyme assays and serum constituents for the summer are given in Table 1.

Results in the rainy season: The enzyme assays and serum constituents estimates determined for the camels in the rainy season are given in Table 2.

DISCUSSION

Normal values: The normal values for ALP estimates in the present investigation agrees with those values reported by Adam *et al.*[6], Purdy[12] and Harvey and Obied[13] who stated that the alkaline phosphatases activities in the camel were exceptionally lower than in other species and had a much narrower scatter of values. The SGPT activities agree with these reported by Anderson[2] and Purdy[12]. The SGOT activities agree with these reported by Adam *et al.*[6] who concluded that there was a higher activity of serum GOT in normal camels and sheep than in cattle and dogs.

The present albumin concentrations are within the normal range determined by Doumas *et al.*[11] and Kaneko[13]. The serum bilirubin concentrations agree with reference values reported by anderson[2] and Purdy[12] but, however, lower than those reported by Soliman and Shaker[14]. Garner[15] concluded that serum bilirubin is of no particular value in the diagnosis of liver disease, Cornelius and Kaneko[5] stated that the determination of serum bilirubin, in ruminants, is occasionally useful but not particularly sensitive in diagnosing hepatic dysfuction. The present cholesterol estimates agree with those values reported by Trinder[10] Anderson[2] and Purdy[12]. The total protein estimates agree with normal range reported by Kaneko[16].

These results were accepted as control normal values particularly when interpreted in the light of the ante-mortem and postmortem evaluation performed on the animals.

Results in the rainy season: Significant differences ($p \leq 0.05$) were obtained in the camels investigated in the rainy season in albumin, SGOT and the alkaline phosphatases. Young *et al.*[17] suggested that sheep at pasture have higher serum GOT and malate dehydrogenase activities than the same sheep when they are penned, Adam *et al.*[6] concluded that a relatively high activity of SGOT in the dromedary may be associated with severe environmental conditions. Boyd[18] reported the lack of change of GPT activity in plasma in ruminants during liver damage.

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