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## HAEMATO BIOCHEMICAL ALTERATIONS IN GOATS INFECTED WITH COCCIDIOSIS

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### ABSTRACT

*Coccidiosis is an important disease which account for anaemia and associated problems like poor growth rate, suppressed resistance and high mortality in kids. While considering the various etiological factors resulting in anaemia among goats of Kerala, coccidiosis account for about 8 per cent, indicating the significance of adopting proper prevention and control measures against this disease. The present study reveals the severity and depth of anaemic changes induced by coccidia in goats. All the haematological parameters, serum biochemical parameters and serum levels of iron, copper and zinc of coccidiosis infected animals are evaluated statistically by comparing with healthy control animals.*

**Key words-** goat, coccidiosis, haematology, serum biochemistry, mineral level.

### INTRODUCTION

Coccidiosis is an important disease of caprines which results in haemorrhagic enteritis especially in kids, by being responsible for severe anaemia and lethality. Goats infected with coccidiosis develop severe anaemia characterized by pale mucosa, conjunctiva and dehydration. These symptoms will be more severe in kids when compared to adults.

Ozlem *et al.* (2004) found many numbers of polypous structures (1 cm. diameter) on intestinal mucosa in coccidiosis affected animals of one and half months old or the older animals

and the mortality was more than 50 per cent in young animals in some flocks affected with coccidiosis. Coccidiosis is highly prevalent in rural goat farming systems of Kerala, which account for high mortality of kids and low productivity of adults. While considering the various etiological factors resulting in anaemia among goats of Kerala, coccidiosis account for about 8 per cent. Infection with coccidia alter the haematological, serum bio chemical and mineral profile of an animal. Understanding the haemato biochemical alterations in infected goats will help to assess the severity of anaemic changes induced by these protozoa.

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## MATERIALS AND METHODS

Faecal samples from 250 animals showing pale mucous membrane were collected and subjected to microscopic examination for detection of parasitic oocysts. From the positive animals, blood was collected in clean and dry vials by puncturing the jugular veins and was held at 4°C until arrival at the laboratory. Ethylene diamine tetraacetic acid, (EDTA) at the rate of 1mg/ml of blood was used as the anticoagulant. Five milliliter blood was collected without anticoagulant for serum. The separated sera were stored at -20° C till further analysis. Haematological evaluation was conducted in auto analyzer. Levels of serum iron, copper and zinc were assessed in atomic absorption spectrophotometer (Perkin-Elmer 3110). Serum total protein was estimated by modified Biuret method described by Weichselbaum (1946) while albumin was estimated by bromocresol green dye binding method as described by Doumas *et al.* (1971) in Hospitex-Screen Master T spectrophotometer using commercially available kits (Greiner). Serum globulin and A/G ratio were calculated from the above obtained values. Serum iron was estimated at wavelength of 248.3 nm, copper at 324.8nm and zinc at wavelength of 213.9nm. A group of apparently healthy animals in the University goat and sheep farm, Mannuthy were selected as the control group. The values obtained for the samples were compared with that of control by using independent 't' test.

## RESULTS AND DISCUSSION

Out of the 250 anaemic goats examined, 8 per cent were infected with coccidia. Highest prevalence and severity of infection were observed in kids below six months of age as reported earlier by Ozlem *et al.* (2004). The

haematological parameters are given in Table 1. When compared to control group, there was significant reduction in the level of Hb, VPRC and total erythrocytic count. The mean MCV and MCHC of coccidiosis infected group were significantly higher than the value of control group. The mean total leukocytic counts of coccidia infection showed a significant increase from that of the control. In the mean differential leukocytic count of infected goats, lymphocytosis was evident. Among the coccidia positive group, the mean value for haemoglobin in blood ( $7 \pm 0.65$ ) was significantly lower than haemoglobin value for control group ( $10.88 \pm 0.67$ ). According to Ozlem *et al.* (2004), the haemoglobin value was 6.5 to 7.2 g/L, VPRC varied between 18-23 per cent, mean total erythrocytic count was  $6-7 \times 10^{12}/L$  and leukocytosis in coccidiosis cases. The serum biochemical values are depicted in Table 2. Mean value of total protein and mean globulin in the coccidiosis infected group was significantly higher than that of the control group. Mean albumin and mean A/G ratio value of coccidiosis infected group was lower than the control group. Ghanem and Abd – Raof (2005) has reported a significant lowering in total protein level of lambs infected with coccidiosis. But the high level of total protein in the present study might be due to hyper globulinaemia while hypoalbuminaemia might be due to the protein lossing enteropathy induced by the coccidia. In parasitic infections, the level of globulin will be increased and albumin will be lowered. This might be the reason for lowering of A/G ratio.

The mean values of iron, copper and zinc in animals infected with coccidiosis were  $0.61 \pm 0.16$ ,  $0.33 \pm 0.07$  and  $0.89 \pm 0.10$  (ppm) respectively (Table 3). Though the levels in

infected group was numerically lower than that of the control group, no significant difference was observed. These findings of the present study are in accordance with observations of Ghanem and Abd Ei – Raof

(2005) in lambs and Katoch and Mandial (2003) in cattle. Goats with microcytic hypochromic anaemia (low levels of MCV and MCHC in all the above animals) will have Fe and Cu deficiency in serum.

Table 1. Haematological parameters of coccidiosis infected goats

Sl. No.	Haematological parameters	Mean values $\pm$ SE	
		Control	Coccidia infected
1	Haemoglobin (g/dl)	10.88 $\pm$ 0.67	7.00 $\pm$ 0.65 <sup>S</sup>
2	Volume of packed red cells (per cent)	32.2 $\pm$ 1.82	22.00 $\pm$ 2.22 <sup>S</sup>
3	Total erythrocytic count ( $\times 10^6$ /mm <sup>3</sup> )	13.55 $\pm$ 0.35	6.85 $\pm$ 0.80 <sup>S</sup>
4	MCV(femtoliters)	23.71 $\pm$ 0.96	32.43 $\pm$ 1.63 <sup>S</sup>
5	MCH(picogram)	3.38 $\pm$ 0.06	3.22 $\pm$ 0.10 <sup>NS</sup>
6	MCHC(g/dl)	800.84 $\pm$ 34.85	1038.32 $\pm$ 47.54 <sup>NS</sup>
7	Total leukocyte count ( $\times 10^3$ /mm <sup>3</sup> )	11.05 $\pm$ 0.35	19.27 $\pm$ 2.03 <sup>S</sup>
8	Neutrophils ( $\times 10^3$ /mm <sup>3</sup> )	40.17 $\pm$ 1.30	52.5 $\pm$ 1.18 <sup>NS</sup>
9	Lymphocytes ( $\times 10^3$ /mm <sup>3</sup> )	54.17 $\pm$ 0.60	41.38 $\pm$ 1.45 <sup>S</sup>
10	Eosinophil ( $\times 10^3$ /mm <sup>3</sup> )	3 $\pm$ 0.56	4.75 $\pm$ 0.59 <sup>NS</sup>
11	Monocytes ( $\times 10^3$ /mm <sup>3</sup> )	2.67 $\pm$ 0.67	1.38 $\pm$ 0.32 <sup>NS</sup>

Table 2. Serum biochemical parameters of coccidiosis infected goats

Sl. No.	Biochemical Parameters	Mean values $\pm$ SE	
		Control	Coccidia infected
1	Albumin (g/dl)	3.60 $\pm$ 0.17	1.90 $\pm$ 0.28 <sup>S</sup>
2	Globulin (g/dl)	2.19 $\pm$ 0.42	4.94 $\pm$ 0.59 <sup>S</sup>
3	Total protein (g/dl)	5.38 $\pm$ 0.36	6.8 $\pm$ 0.41 <sup>S</sup>
4	A/G ratio	0.9 $\pm$ 0.27	0.47 $\pm$ 0.13 <sup>S</sup>

Table 3. Serum mineral status of coccidiosis infected goats

Sl. No.	Minerals (ppm)	Mean values $\pm$ SE	
		Control	Coccidia infected
1	Iron	0.64 $\pm$ 0.07	0.61 $\pm$ 0.16 <sup>NS</sup>
2	Copper	0.40 $\pm$ 0.06	0.33 $\pm$ 0.07 <sup>NS</sup>
3	Zinc	0.87 $\pm$ 0.11	0.89 $\pm$ 0.10 <sup>NS</sup>

<sup>s</sup>- significant variation, <sup>NS</sup>- Non significant variation (p<0.05)

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