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## Comparative haemato-biochemical study of buparvaquone plus ivermectin and buparvaquone plus topical cypermethrin in theileriosis infected cross bred Cattles

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### Abstract

103 cross bred cattle selected randomly irrespective of age, breed, sex, physiological status, farming system etc. and blood samples were collected in EDTA and plain vials. Samples were screened for the presence of *Theileria spp.* schizonts by microscopy and further analysed to estimate haemato-biochemical parameters. There was 7/103 (6.79%) cattles were positive for *Theileria spp.* by microscopic examination of blood smear. Considerable improvement in Hb, PCV, TEC and Platelets was observed in the group treated with Buparvaquone + Ivermectin. Similar improvement on Total protein, Albumin and A: G ratio was observed in same group. Reduction in TLC value (26.68%) was observed in Buparvaquone + Ivermectin treated group, while in Buparvaquone + Cypermethrin treated group TLC was increased by 2.54%. Aspartate transaminase and Alanine transaminase values increased in both groups however more increase is noted in Buparvaquone + Ivermectin treated group. Total bilirubin in Buparvaquone + Ivermectin treated group decreased by 1.85% while increase in total bilirubin value (92.00%) observed in Buparvaquone + Cypermethrin treated group. Comparatively superior results were obtained in Buparvaquone + Ivermectin treated group.

**Keywords:** Theileriosis, blood smear, buparvaquone, ivermectin, cypermethrin

### Introduction

In recent year frequent outbreaks of diseases such as Foot and Mouth Disease, Brucellosis, Haemorrhagic Septicaemia, Black Quarter, Haemoprotozoan diseases, etc. has been recorded and which ultimately affects the health of livestock significantly and hence the productivity, declined. Haemoprotozoan infections (particularly theileriosis, babesiosis and anaplasmosis) are very common in tropical and subtropical regions and cause major economic losses to the livestock industry (Velusamy *et al.*, 2014) [11]. Clinical manifestation of an animals suffering from haemoprotozoan infection includes fever, anorexia, anaemia, emaciation, threatened abortion and death in the acute form of infections (Maharana *et al.*, 2016) [6]. Theileriosis caused by *Theileria annulata* (Tropical theileriosis), *T. parva*, (East coast fever) and *T. orientalis* (Oriental theileriosis) in bovines and transmitted through the saliva of tick bite site due to ticks like *Hyalomma* and *Rhipicephalus* with higher incidence in the crossbred cow of all age groups (Kumar *et al.*, 2019) [5]. Previous studies showed that generally there is high prevalence of disease in summer and monsoon season, disease incidence is most common in lactating, pregnant and crossbreed animals. Various predisposing factors like high production, low nutrition and poor hygiene influence the occurrence of the theileriosis (Suryawanshi, 2022) [9].

### Materials and Methods

103 cross bred cattle were selected randomly irrespective of age, breed, sex, physiological status, farming system etc. and blood samples were collected in EDTA and plain vials. Samples were screened for the presence of *Theileria spp.* Schizonts by microscopy and further analysed to estimate haemato-biochemical parameters.

## Results and Discussion

There was 7/103 (6.79%) cattles were positive for *Theileria spp.* by microscopic examination of blood smear (Fig. 1). Similar findings were also reported by various workers. Shah *et al.*, (2020) [8] reported prevalence of Theileriosis 5.83% in Marathwada region in Maharashtra by blood smear examination. Jayalakshmi *et al.*, (2019) [2] reported overall 2.19% prevalence of *Theileria spp.* and higher prevalence 7.8% was recorded in summer months with blood smear examination in Tamilnadu state of India. Khawale *et al.*, (2019) [4] reported Giemsa staining of blood smears of cattle revealed overall prevalence of theileriosis (22.38%) in Marathwada region of Maharashtra.

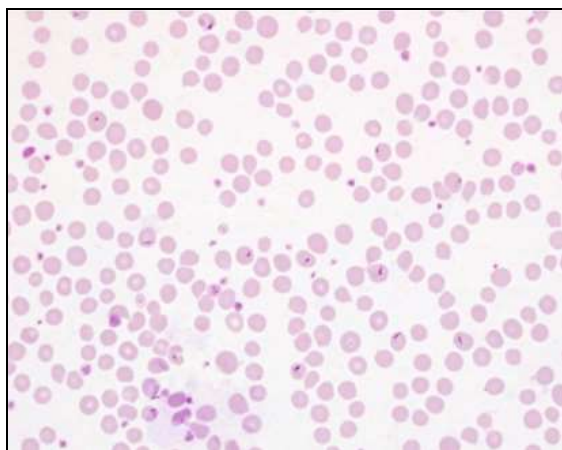


Fig 1: Giemsa staining (*Theileria spp.*)

### Comparative changes in Haemato-biochemical parameters in groups treated with Buparvaquone + Ivermectin and Buparvaquone + Cypermethrin

Considerable improvement in Hb, PCV, TEC and Platelets was observed in the group treated with Buparvaquone + Ivermectin. Similar improvement on Total protein, Albumin and A: G ratio was observed in same group (Table: 1). Yousef *et al.*, (2020) [12] who reported that before treatment of

buparvaquone were Hb (g / dl)  $7.12 \pm 0.19$  TEC (x 106/  $\mu$ l)  $3.7 \pm 0.12$  while, after treatment Hb (g / dl)  $7.2 \pm 0.16$ , TEC (x 106/  $\mu$ l) in *T. annulata* infected cattles (n=22). Suthar *et al.*, (2020) prior to treatment Hb (g/dl) 1.8, HCT (%) 5.2, RBC ( $10^6$  / $\mu$ l) 0.98, and PLT ( $10^3$  / $\mu$ l) 239, which was improved by treatment with Buparvaquone were Hb (g/dl) 2.5, HCT (%) 7.6, RBC ( $10^6$  / $\mu$ l) 1.97, and PLT ( $10^3$  / $\mu$ l) 754. Reduction in TLC value (26.68%) was observed in Buparvaquone + Ivermectin treated group, while in Buparvaquone + Cypermethrin treated group TLC was increased by 2.54%. Above findings in accordance with Saravanan *et al.*, (2017) [7] reported theileria infected cattles (n=9) before treatment were  $9.14 \pm 0.75$  while, after treatment with Buparvaquone  $9.512 \pm 0.31$ .

Aspartate transaminase and Alanine transaminase values increased in both groups however more increase is noted in Buparvaquone + Ivermectin treated group. Findings were related to Kachhawa *et al.*, (2016) [3] reported that biochemical values before treatment were ALT (IU/L)  $70.37 \pm 6.41$ , AST (IU/L)  $106.44 \pm 6.17$  while, after treatment with Buparvaquone were ALT (IU/L)  $53.37 \pm 6.54$ , AST (IU/L)  $72.04 \pm 6.69$ . Alkaline phosphatase was decreased in both groups while percent decrease was considerably high in Buparvaquone + Ivermectin treated group. Above findings were in accordance with Dede *et al.*, (2014) [1] reported that alkaline phosphatase before treatment were  $111.40 \pm 14.85$  while, after treatment with Buparvaquone were reduced to  $64.18 \pm 9.76$  in theileria infected cattles (n=28).

Total bilirubin in Buparvaquone + Ivermectin treated group decreased by 1.85% while increase in total bilirubin value (92.00%) observed in Buparvaquone + Cypermethrin treated group. The above findings were related to Kumar *et al.*, (2019) [5] who reported that liver enzyme values before treatment of buparvaquone were serum bilirubin 1.62 (mg/dl), while after treatment with Buparvaquone had mark improvement as serum bilirubin 0.98 (mg/dl).

Comparatively superior results were obtained in Buparvaquone + Ivermectin treated group.

Table 1: Changes in Haemato-biochemical parameters in groups treated with Buparvaquone + Ivermectin and Buparvaquone + Cypermethrin

Parameter	% Increase / Decrease	
	Buparvaquone + Ivermectin	Buparvaquone + Cypermethrin
Hb (g/dL)	88.98	19.35
PCV (%)	69.07	-2.72
TEC ( $10^6$ /mm <sup>3</sup> )	97.17	5.96
TLC ( $10^3$ /mm <sup>3</sup> )	-26.68	2.54
Neutrophils (%)	-14.21	14.51
Lymphocytes (%)	6.57	-8.63
Monocytes (%)	244.83	0.00
Eosinophils (%)	0	514.29
Basophils (%)	0	0.00
Plateletes (lac/ $\mu$ l)	78.40	41.86
Total Bilirubin (mg/dl)	-1.85	92.00
Direct Bilirubin (mg/dl)	37.50	285.71
Indirect Bilirubin (mg/dl)	-18.42	-58.82
Alkaline Phosphatase (IU/L)	-78.67	-37.21
Aspartate Transaminase (IU/L)	80.59	23.34
Alanine Transaminase (IU/L)	57.99	38.95
Total Proteins (gm/dl)	16.24	1.65
Albumin (gm/dl)	40.13	-27.71
Globulin (gm/dl)	2.83	31.43
A/G Ratio	35.90	-50.00

## Conclusion

The results of this study indicate a prevalence of 6.79% for *Theileria* spp. in cattle based on microscopic examination of blood smears, consistent with similar findings reported in various regions. Treatment with Buparvaquone + Ivermectin showed significant improvements in hemato-biochemical parameters, including hemoglobin, packed cell volume, total erythrocyte count, platelets, total protein, albumin, A:G ratio, and alkaline phosphatase, as well as a decrease in total bilirubin. These findings align with previous research and suggest that Buparvaquone + Ivermectin treatment offers superior outcomes compared to Buparvaquone + Cypermethrin, demonstrating its efficacy in managing Theileriosis in cattle.

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