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EFFECT OF HERBAL TREATMENT ON HAEMATOLOGY OF BRIOLER CHICKENS INFECTED WITH ENTEROPATHOGENS

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ABSTRACT

Tinospora cardiofolia based herb extract was used to improve the haematological values that were negatively affected during the bacterial enteritis in the broiler chickens. Bacterial enteritis was experimentally produced in 60 chickens by oral administration of 2ml bacterial suspension of enteropathogenic *E. Coli* and *Salmonella* (10^9 organisms / ml) to each chick while 30 chicks were kept as control (Group C). Thirty out of these 60 chicks were treated with herbal mixture @ 100g/50kg feed for 7 days post infection (Group A) while 30 chicks were kept untreated (Group B). Blood samples for haematological analysis (Hb, ESR, DLC and TLC) were collected from each group at interval of 5 days i.e 18^{th}, 23^{rd}, 28^{th} and 33^{rd} day of age. The results showed that Hb in Group B was significantly lower than Group A and C at 23^{rd} day of age while ESR value was significantly lower in Group B as compare to other groups on all sampling days. Significant lower no. of TLC was also observed at 23^{rd} day of age in Group B where as there was no significant difference on other sampling days. DLC demonstrated that there was increased no. of Neutrophil, Eosinophils and Basophils in Group B while Group A and C showed same patterns. Monocytes and Lymphocytes were significantly lower in number in Group B as compare to Group A and C which was indicative of immunosupperssion. This study demonstrated that herbal treatment of infected chicks had rectified the immunosuppressive & anemic effects of enteropathogens.

Key words: *E. Coli, Salmonella,* bacterial enteritis, enteropathogens, *Tinospora cardiofolia* extract.

INTRODUCTION

Enteropathogenic bacteria causing bacterial enteritis especially *E.coli* and *Salmonella* are very harmfull to poultry of any age group and cause inflammation in mucosa of duodenum and adjoining parts of small intestine (Chauhan and Roy, 1996). Due to development of antibiotic resistance in *E. coli* and *Salmonella* especially against Flouroquinolones, the use of antibiotics is restricted. More over antibiotics also destroy the normal micro flora of gut. (Wistrom and Norrby, 1995). Keeping this in mind we tested a herbal extract of *Tinospora cardiofolia* and *Carvacol.*

MATERIALS AND METHODS

The present experiment was conducted to investigate the impact of herbal extracts on broiler chicks during bacterial enteritis. One day old ninety chicks were reared under standard managemental conditions. Chicks were provided with feed and water adlibitum. At the age of 14 days the chicks were randomly divided into three experimental groups A, B and C comprising 30 chicks each. Each chick of group A and B was given orally 2 ml of bacterial suspension of pathogenic *E.coli* and *Salmonella* having 10^9 CFU per ml. Twenty four hours after the bacterial administration the chicks in group A were given feed containing extract of *Tinospora cardiofolia* and *Carvacol* @ 2 g/kg feed for 7 days.

Blood samples were collected from five chicks of each group at interval of 5 days i.e. 18^{th}, 23^{rd}, 28^{th} and 33^{rd} day of age. 5 – 10 ml blood was collected for haematological analysis (ESR, Hb, TLC and DLC) in separate test tubes having anticoagulant. The procedures of these tests are as follow.

Erythrocyte Sedimentation Rate (ESR)

ESR value, Hb percentage and TLC was determined by the method as described by World Health Organization (2005). Moreover, different types of leucocytes such as Lymphocytes, Eosinophils, Basophils, Neutrophils and Monocytes were identified and counted separately as described by World Health Organization (2005). The data of all the experimental groups was analysed by analysis of variance and differences in various groups were worked out by using LSD test ($P<0.05$) as described by Steel and Torrie (1982).

RESULTS AND DISCUSSION

It was observed that the ESR of group B showed significantly lowered values throught the experiment when compared to group A and C (table 1). These values showed a variation from finding of Ather and Ahmad (1996).

Haemoglobin percentage showed a significant decrease in diseased birds only when they were 23 days old (Table 1). This might be due to amaemia because of bacterial enteritis, this finding resembles with the findings of Shane (1999).

A significant reduction in TLCwas observed in birds of group B at 23rd day of age, showing 8.30±1.78 1000/mm^3 leukocytes. This value of TLC was significantly lower than group A and C (Table 1). Group A had 11.26±1.23 1000/mm^3 and group C had 10.62±0.57 1000/mm^{3}leukocyte number. Non significant difference was noted in TLC values of group A and C. During immunosupression the TLC number changes as bacterial and viral diseases cause leucopenia. Our findings are in line with the findings of Wilson (1998) who found immunosupression in poultry due to intestinal infection.

Eosinophils are motile, phagocytic cells that can migrate from blood into the tissue. These are found in all cases of allergies and parasitic infections (Kuby, 1996). In our study significant increased number of eosinophils were observed in group B at 28th day of age, which recieved bacterial infection. Where as non significant difference was observed in eosinophil number of group A and C. (Table 2)

Table 1. Mean values of ESR, Hb and TLC in Group A, B & C.

Parameters	Age in days	Group A (Infected & treated) n = 30	Group B (Infected only) n = 30	Group C (Control) n = 30	
ESR (mm/h)	18	1.7±0.33	1.2±0.15	1.5±0.22	0.0274 *
	23	1.9±0.42	1.2±0.16	1.4±0.10	0.0068**
	28	2.0±0.33	1.4±0.15	1.4±0.13	0.0019**
	33	1.7±0.44	1.3±0.18	1.4±0.09	0.0512*
Hb (%)	18	13.98±2.41	12.06±0.75	13.24±0.43	0.1608^{NS}
	23	13.90±0.85	12.14±1.19	13.50±0.32	0.0252*
	28	13.26±0.34	12.78±0.47	13.32±0.51	0.1513^{NS}
	33	13.42±0.33	12.62±1.92	13.56±1.18	NS
TLC (1000/mm^3)	18	10.14±3.04	7.10±2.00	9.76±1.08	0.0966^{NS}
	23	11.26±1.23	8.30±1.78	10.62±0.57	0.0085**
	28	10.42±1.36	9.85±1.00	9.96±1.05	0.2815^{NS}
	33	11.38±3.30	9.80±0.65	10.76±1.14	NS

Basophils function by releasing substances of cytoplasmic granules. Basophils are not phagocytic their major role is in allergic response (Kuby, 1996). Significant increase in number of basophils among group B and C was observed on 18th and 33rd day of age.

Neutrophils are phagocytic cells and first line of defense against the invader microbial organisms. Their number increases in infections (Kuby, 1996). Significant increased number of neutrophils was observed at 18th and 28th day of age among group B and C.

Lymphocytes are concerned with immune defense mechanism and their increased number may indicate an exessive antibody defense reaction (Doxey and Nathen, 1989). Lymphocyte percentage was significantly decreased in group B at 18th, 23rd and 28th day of age, as compare to group A and C. The low percentage of lymphocyte was a sign of infected immune system. Similar depression in immune system was also reported (Anonymous, 2005) in the chickens infected with poulty enteritis mortality syndrome.

Monocytes are involved in the removal of tissue debris and hence they are particularly numerous in chronic diseases when debris builds up (Doxey and Nathen, 1989). Monocytes increased in group B on 28th day of age, while on 23rd day of age significant reduction in monocytes was observed.

The results of hematology of group B indicated that during *E.coli* and *Salmonella* infection, Hb%, TLC, ESR and lymphocytes values showed a decreasing pattern. The disturbance in these values resulted in anemia and impaired immune system due to which the birds of this group became susceptible to other infectious diseases. While the values of group A were non significantly different from group C, which was control group.

Table 2. Mean values of DLC in Group A, B & C.

Age in days	Type of WBC	Group A (Infected & treated) n = 30	Group B (Infected only) n = 30	Group C (Control) n = 30	
18	Eosinophils	1.72±0.47	2.12±0.56	1.86±0.30	NS
	Basophils	1.00±0.37	2.28±0.66	1.24±0.66	0.0099**
	Neutrophils	26.64±1.18	30.52±2.02	26.72±2.07	0.0075**
	Lymphocyte	60.14±1.39	55.88±1.33	59.48±1.91	0.0021**
	Monocytes	10.5±0.66	9.24±0.81	10.72±0.65	0.0132**
23	Eosinophils	1.14±0.59	2.28±0.84	1.46±0.63	0.0612*
	Basophils	1.36±0.60	2.12±0.74	1.28±0.61	0.1216^{NS}
	Neutrophils	26.12±3.14	30.40±4.56	26.96±0.74	0.1273^{NS}
	Lymphocyte	59.92±2.07	56.82±2.76	60.08±0.68	0.0440*
	Monocytes	11.26±1.23	8.30±1.78	10.62±0.57	0.0085**
28	Eosinophils	1.06±0.37	1.82±0.24	1.88±0.08	0.0005**
	Basophils	1.40±0.35	2.00±0.41	1.66±0.47	0.1096^{NS}
	Neutrophils	28.98±1.16	25.46±1.17	27.40±1.68	0.0052**
	Lymphocyte	60.36±1.39	57.74±0.83	59.52±1.32	0.0145**
	Monocytes	9.30±1.56	11.38±1.01	9.94±1.22	0.0427*
33	Eosinophils	1.30±0.58	2.10±0.51	1.60±0.32	0.6350^{NS}
	Basophils	1.20±0.48	1.98±0.33	1.34±0.31	0.0165*
	Neutrophils	26.76±3.90	27.26±1.80	26.74±1.19	NS
	Lymphocyte	60.52±2.30	58.68±0.90	59.98±0.78	0.1789^{NS}
	Monocytes	10.62±1.38	9.98±0.78	10.34±0.65	NS

NS = Non significant, * = Significant, ** = Highly significant

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