

## Hematological alterations in broiler chicks during different seasons supplemented with herbal formulations

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### Abstract

The study was conducted on *Vencobb* broiler chicks to ascertain the antistress affects of Zist, Zeetress and a combination of Amla and Turmeric during summer, rainy and winter seasons and thereby the haematological changes of birds revealed that during all the three seasons a marked improvement in Haemoglobin was encountered in all the three groups where herbal preparations were supplemented. A marked increase in the lymphocyte count occurred during summer and winter seasons in all the experimental groups of bird as compared to the control group. The heterophil count was decreased with the supplementation of herbal formulations in the feed irrespective of the seasons encountered in the season. This decrease in heterophil count was highly significant in seasons like summer, winter and rainy. This observation proves the hepato-stimulatory, hepato protective and immuno modulating effects of herbal preparations.

**Keywords:** Broiler, Chick, Haematology, Supplementation, Herbal formulation.

### Introduction

Anything which disrupts, physiological and psychological stability of an organism is a "Stressor" and the reaction of an organism to the stressor is termed "Stress". Nathan *et al.* (1976) had experimentally proved that heat stress caused a significant decrease in leukocyte count. Mc Farlane *et al.* (1989) evaluated increased heterophil and decreased lymphocyte percentage because of stress. Altan *et al.* (2003) recorded a significant decrease in heterophil/lymphocyte and in basophil ratio due to heat stress in broilers. Pande (2003) mentioned that an altered ratio of heterophil: lymphocyte results due to stress of any form. Heat stress decreased lymphocytes, but increased heterophil. After heat stress the blood Haemoglobin decreased (Borges *et al.*, 2004).

Recently the emphasis is being directed towards the search of herbal formulations which could be effective in the management / reduction of stress and its consequences leading to the improvement in production in birds as several Indian herbs are reported to possess adaptogenic, antistress and immunomodulator properties (Pande, 2003).

With due consideration to the aforementioned facts, the present study was planned to ascertain the comparative efficacy of certain herbal

formulations floated in the market to this effect, including Amla in combination with Turmeric powder, to overcome the stress in broiler chicks with the objectives to mark the changes in blood parameters like Haemoglobin, Differential Leukocyte Count, at the age of 42nd day, after herbal formulations as compared to the control group.

### Material and Methods

The present study was conducted in three seasons (summer, rainy, winter) using, day-old 200 *Vencobb* chicks for each season.

The chicks were randomly divided in four equal groups. The experiment lasted for 6 weeks during all the seasons. Usual procedures of vaccination and managerial practices were strictly adopted in all the three schedules as per the procedure and practice in vogue. The chicks of Group-C1 served as control which of Group-C2 received amla plus turmeric powder each @ 5 gm/Kg of feed, chicks of Group-C3 received Zeetress @ 250 mg/500ml of drinking water and Group-C4 Zist @ 250mg/Kg feed. At the end of 6th week blood samples were collected from three birds of each replicate with different dietary treatments. Haemoglobin concentration (g/dl) and differential leukocyte count (%) were recorded as per the procedure described by Jain (1986). The data were statistically analyzed for analysis of

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**Table-1: Mean and standard errors of Haemoglobin, Lymphocyte and Heterophil of birds fed standard ration (S.R.) with various herbal formulations during different seasons.**

Parameter	Season	Ration group			
		Group I	Group II	Group III	Group IV
Haemoglobin	Summer	9.39 <sup>a</sup> ±0.47	10.97 <sup>a</sup> ±0.32	11.23 <sup>ab</sup> ±0.55	11.97 <sup>b</sup> ±0.45
	Rainy	10.87±0.44	11.24±0.25	11.35±0.64	12.00±0.44
	Winter	11.04±0.33	12.11±0.28	12.22±0.67	13.06±0.63
Lymphocyte	Summer	43.4 <sup>a</sup> ±0.40	49.8 <sup>c</sup> ±0.66	47 <sup>b</sup> ±0.44	49.2 <sup>c</sup> ±0.37
	Rainy	51 <sup>b</sup> ±1.22	52.8 <sup>b</sup> ±0.37	52 <sup>b</sup> ±0.31	43.6 <sup>a</sup> ±0.50
	Winter	52.8 <sup>a</sup> ±0.37	57.4 <sup>b</sup> ±0.50	57.2 <sup>b</sup> ±0.37	57 <sup>b</sup> ±0.44
Heterophil	Summer	30.16 <sup>c</sup> ±0.10	30.24 <sup>c</sup> ±0.12	27.26 <sup>a</sup> ±0.21	29.42 <sup>b</sup> ±0.19
	Rainy	27.20 <sup>c</sup> ±0.32	23.44 <sup>a</sup> ±0.17	24.90 <sup>b</sup> ±0.23	23.48 <sup>a</sup> ±0.20
	Winter	22.24 <sup>d</sup> ±0.42	18.38 <sup>a</sup> ±0.19	18.4 <sup>b</sup> ±0.18	20.46 <sup>c</sup> ±0.25

Note: Group I → Control (Standard Ration)

Group III → Standard Ration with Zeetress

Group II → Standard Ration with Amla and Turmeric

Group IV → Standard Ration with Zist

a, b, c, d : Means with at least one common alphabet as superscript do not differ significantly from each other.

variance, employing Randomized Block Design (RBD) method as recommended by Snedecor and Cochran (1994).

### Result and Discussion

In the present study three blood samples were analyzed for Haemoglobin and DLC from each replicate. The data in table 1 is self explanatory that during all the three seasons a marked improvement in Haemoglobin was encountered in all the three groups where herbal preparations were supplemented. When the data was subjected to analysis of variance it showed that the changes were highly significant in summer. This shows that the increase Haemoglobin is having direct relationship with the better gain in weight and reduced stress effect. This increased haemoglobin might be due to the hepato-stimulatory and hepato-protective affects of herbs resulting in the formation of more haemoglobin by the bone marrow which was under the control of erythropoetic factors released by hepatic cells (Sarma *et al* 2003).

In the present study a marked increase in the lymphocyte count occurred during summer and winter seasons in all the experimental groups of bird as compared to the control group. This showed the positive effect of herbal preparations which were responsible to above favorable variation by minimizing the possible stress. As compare to these, the increase in lymphocyte count during rainy season was fewer (Tables 1). However, the analysis of variance for all the seasons was highly significant. Pande (1997) observed that lymphocyte ratio increased several times over control while in the group

that had received Zeetress, the ratio remained very close to the level measured in the healthy control. While Altan *et al.* (2003) recorded a significant decrease in heterophil/lymphocyte and in basophil ratio due to heat stress in broilers. Similar observations were noted by Borges *et al.* (2004). While Mc Farlane *et al.* (1989) evaluated increased heterophil and decreased lymphocyte percentage because of stress. Pande (2003) mentioned that an altered ratio of heterophil lymphocyte results due to stress of any form. This ratio increased many fold as compared to non-stressed birds.

In the present study the heterophil count, as evinced by the analysis of variance presented that it decreased with the supplementation of herbal formulations in the feed irrespective of the seasons encountered in the season. This decrease (Table 1) in heterophil count was highly significant in seasons like summer, winter and rainy. This observation proves the immuno modulating effect of herbal preparations. Sundaresan *et al.* (1990) reported an increase in total WBC, eosinophil and basophils in albino rats due to cold stress. Where as Tizard (1992) observed that the stress factor show depressed immune activity resulting in immuno-suppression. Nathan *et al.* (1976) reported that heat caused a significant decrease in leucocytes counts and an increase in corticosterone concentration in plasma and an increase of ascorbic acid in plasma and in leucocytes.

### References

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