Original Research

Effect of Supplementation of Phytobiotic Shatavari (*Asparagus racemosus*) on the Biochemical Parameters in Raja II Broilers

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Abstract

The experiment was conducted for a period of six weeks on 300 day old straight run RAJA II broiler chicks, wing banded and randomly assigned to five groups with 60 chicks in each with a four replicates of 15 chicks in each groups (T_1, T_2, T_3, T_4 and T_5). The diets were fed ad libitum to chicks by adding 0, 0.25, 0.5,1 and 1.5% Asparagus racemosus (Shatavari) root powder in the ration of T_1, T_2, T_3, T_4 and T_5 groups respectively. The findings of the experimental trial reveals that the serum cholesterol, LDL, HDL and serum proteins in groups supplemented with Shatavari were significantly (P>0.05) different compared to control group. While decrease in serum cholesterol and LDL was recorded in Shatavari supplemented in treatment T3 and T4 as compared to other groups. However significant (P>0.05) increase in serum proteins was observed in treatment T_3 among Shatavari supplemented groups.

Key words: Broilers, Cholesterol, Shatavari, Serum

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Introduction

Indian poultry industry occupies an important role among agricultural industries as it is an important source of animal protein for human population. Which has emerged on the world poultry map as the 3rd largest eggs (66 billion eggs) and 5th largest poultry meat (2.6million tons) producer. Indian broiler industry is growing at a rate of 10-15% per annum (Chikwa *et al.*, 2018).Various herbal feed additives are better for feeding of broilers as liver tonic, immunomodulator and adoptogenic to stress and toxins, leading to lower mortality, morbidity and enhance growth and production performance. "Shatavari" is one of the important medicinal plants known as the "queen of herbs" in Ayurveda that produces saponins which are responsible

for the pharmacological activities and having properties like nutritive tonic, anti-stress (Kamat *et al.*, 2000). Supplementation of shatavari root powder had beneficial effect on body weight and feed conversion efficiency and improves general health status of the bird. Hemoglobin (Hb) and packed cell volume (PCV) concentration increased in the treatment group supplemented with 1% shatavari root powder as compared to control the group of broiler chicken according to Rekhate *et al.* (2010). Bhardwaj *et al.* (2009) reported that the supplementation of shatavari root powder in broiler birds improved the protein level in the blood. Lower serum cholesterol level observed lower in shatavari treated group of rats by Bhosale *et al.* (2012). Therefore, the present study was planned to explore the effect of shatavari on biochemical profile of broiler.

Materials and Methods

Three hundred number of day old straight run Raja II broiler chicks were obtained from AICRP on Poultry for Meat, Veterinary college, Hebbal, Bengaluru for the experimental study.

Table 1: Per cent ingredient and nutrient composition of basal experimental diet (as per BIS-2007)

Ingredients	Pre-starter (0-7 days)	Starter (8-21 days)	Finisher (22-42 days)
Yellow maize	51	55	58.5
Soya bean meal (46%)	41.92	37.5	32.5
Vegetable oil	3.1	4	5.5
Dicalcium phosphate	1	1	1
Common salt	0.3	0.3	0.3
Mineral mixture*	2	2	2
Vitamin premix **	0.1	0.1	0.1
DL-Methionine	0.1	0.1	0.1
Liver tonic	0.13	0.13	0.13
Mycotoxin Binder	0.1	0.1	0.1
Coccidiostat	0.09	0.09	0.09
Total	100.0(99.84)	100.0 (100.32)	100.0 (100.32)
Nutrient Composition			
ME (Kcal/kg) [b]	2966.6	3074.89	3138.22
Crude protein (%) [b]	22.89	19.22	18.09
Calcium (%) [a]	1.01	0.91	0.855
Phosphorous (%) [a]	0.46	0.37	0.355
Lysine (%) [a]	1.4	1.18	1.03
Methionine (%) [a]	0.49	0.39	0.342

Mineral mixture: Each 100 g contains Magnesium oxide- 1.48g, Ferrous sulphate- 6.0g, copper sulphate- 0.05g, Manganese Sulphate-0.04 g, Potassium Iodide- 0.001g, Potassium Chloride-17.09g and Sodium selenite- 0.001g.
*** Vitamin-mineral Premix: Each 100g contains Vitamin AD3 (Vitamin A-10,00,000 IU/g, Vitamin D-200000 IU/g)-0.165g, Vitamin K3-0.103g, Vitamin E- 2.4g, Thiamine Mononitrate- 0.206 g, Riboflavin- 0.513g, Pyridoxine hydrochloride- 0.309g, Cyanocobalamine- 0.00031g, Folic acid- 0.103g, Niacin-4.124 g, Ca-D-Pantothenate-1.031g, Biotin- 1.5g, Maltodextrine- 89.545g; [a] calculated values; [b] analyzed values*

Chicks were wing banded, weighed and randomly distributed into five treatment groups (T_1- T_5) with four replicates (R_1-R_4) in each treatment group and with 15 chicks in each replicate. Chicks were reared under

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deep litter system upto 6 weeks of age, with supply of *ad libitum* feed and water. The diet T_1 control (without Shatavari), T_2 (control + 0.25 per cent Shatavari), T_3 (control + 0.5 per cent Shatavari), T_4 (control + 1 per cent Shatavari) and T_5 (control + 1.5 per cent Shatavari). Approved managemental practices and standard vaccination schedule were followed during the experiment. Feed ingredients required for the formulation of the experimental diets were procured from the feed mill unit of the Department of Poultry Science, Veterinary College, KVAFSU, Hebbal, Bengaluru-24 and prepared as per the recommendations of BIS (2007).The feed formulations of the diets used in the trial are presented in Table 1. The sample of Shatavari root powder was procured from Classic Medi. Herbs Pvt. Limited 253/2, 3rd main road, Roopena Agrahara, Bommanahalli, Bengaluru- 560068, Karnataka.

Lipid Profile

For the determination of serum cholesterol, LDL, HDL and serum proteins, the blood samples were collected from three birds selected randomly from each replicate of all the treatment group at the end of 6th week, serum was separated individually and each treatment group was pooled separately and subjected to estimation of total serum cholesterol, LDL and HDL by enzymatic method, using auto analyzer kits. Serum protein concentration in serum was estimated by Biuret method with the help of Span Diagnostic Kit at 545 nm wavelength. Concentration of plasma total proteins was expressed in g/dl**.** Test: 0.1 ml of serum was taken in a test tube and 4.9 ml of 0.75 N sodium hydroxide was added and mixed thoroughly. Blank: 5.0 ml of 0.75 N sodium hydroxide was taken in a separate test tube. In test and blank, 1.0 ml of biuret reagent was added and mixed and wait for 20 minutes. The unknown was read against the blank at 545 nm wavelength. Total serum protein is calculated by the following formula-

Total serum protein (mg/ 100 ml) = O.D x 16.16

Statistical Analysis

Data pertaining to various parameters obtained during the trial were analyzed statistically by ANOVA using SPSS 20.0 statistical software. Differences between the means were tested using Duncans Multiple Range Test Duncan (1995) at $P \leq 0.05$.

Results and Discussion

Serum Cholesterol

The results of serum cholesterol for different treatment group are furnished in Table 2 and graphically depicted in Fig. 1. The mean serum cholesterol levels ranged from 97.83 mg/dl in T_3 (0.5 per cent Shatavari) to 129.33 mg/dl in T_1 diet group. Statistical analysis revealed that there was significant difference in T_3 group when compared to T_1 and T_2 group. However, T_3 was non-significantly comparable with T_4 and T_5.

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However, T_2 was non-significantly comparable with T_5. Similar findings were reported by Bulbul *et al.* (2009), Rekhate *et al.* (2010) and Kant *et al.* (2014), Dahale *et al.* (2014).

Table 2: Effect of supplementation of Shatavari on serum cholesterol, LDL, HDL and serum protein values (Mean ± SE) of Raja II broilers

Experimental Group	Description of the Treatment	Serum Cholesterol (mg/dl)	LDL (mg/dl)	HDL (mg/dl)	Serum Proteins (mg/dl)
T_1	Control(without Shatavari)	129.33±4.46^{a}	82.23±4.12^{a}	40.58±1.01^{a}	3.07±0.14^{c}
T_2	Control+0.25%Shatavari	109.67±3.93^{b}	59.92±7.33^{b}	35.67±0.58^{b}	3.63±0.49^{ab}
T_3	Control + 0.5%Shatavari	97.83±2.98^{c}	59.83±3.16^{b}	36.50±0.96^{b}	3.92±0.20^{a}
T_4	Control+ 1%Shatavari	98.41±2.75^{c}	47.39±2.63^{b}	37.75±1.23^{b}	3.30±0.20^{bc}
T_5	Control + 1.5%Shatavari	106.75±2.67^{bc}	50.43±3.01^{b}	36.75±0.88^{b}	3.63±0.21^{ab}

Means bearing different superscript column wise differ significantly (P≤0.05)

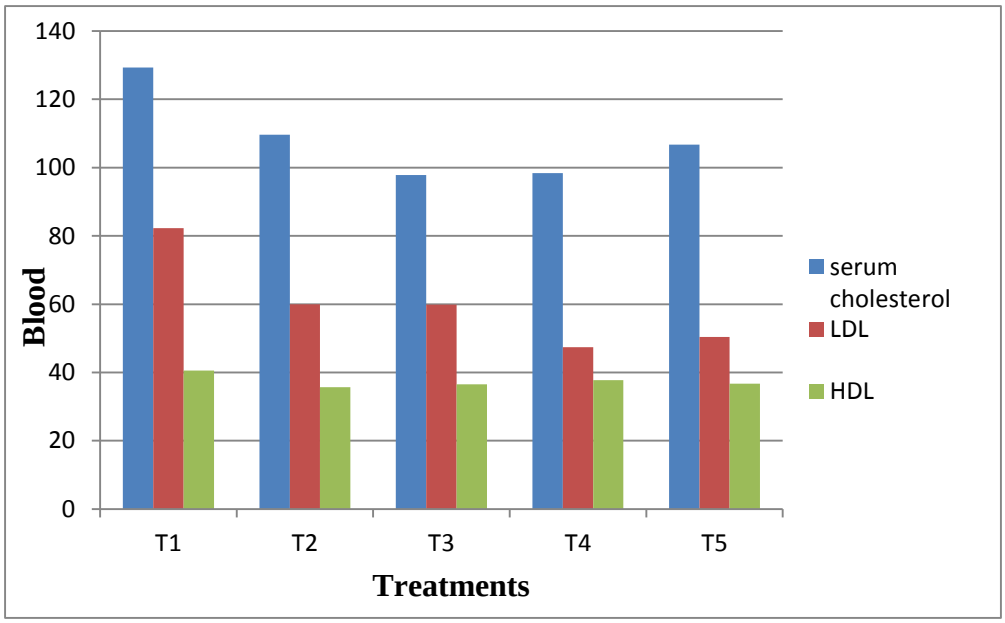

Fig. 1: Mean blood profile values (mg/dl) of Raja II broilers fed with different levels of Shatavari during 0 to 6 weeks

Low Density Lipoproteins (LDL)

The results of effect of supplementation of various levels of Shatavari in Raja II broilers at the end of 42 days of experimental period on low density lipoproteins are presented in Table 2 graphically depicted in Fig. 1. The mean LDL values ranged from 47.39 mg/dl in T_4 (1.5 per cent Shatavari) to 82.23mg/dl in T_1 (control) diet group. Significant difference in LDL levels was observed in T_2, T_3, T_4 and T_5 when compared to control T_1. Non-significant difference (P>0.05) was observed among various treatments (T_2, T_3, T_4 and T_5). Similar findings were reported by Bhardwaj *et al.* (2009).

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High Density Lipoproteins (HDL)

The mean HDL values ranged from 35.67 mg/dl in T_2 (0.25 per cent Shatavari) to 40.58 mg/dl in T_1 (control) diet group. Significant difference in HDL levels was observed in T_2, T_3, T_4 and T_5 when compared to control (T_1). However, non-significant difference ($P>0.05$) was observed among various treatments (T_2, T_3, T_4 and T_5) presented in Table 2graphically depicted in Fig. 1. Similarly, broilers in group T1 and T2 which were fed with herbal feed supplement *Asparagus racemosus* (Shatavari) root powder at the rate of 0.25 % and 0.5 % showed lower values for HDL than the control group fed without herbal feed supplementation Visavadia and Narasimhacharya (2005). Dahale *et al.* (2014) reported that HDL concentration was significantly ($P<0.05$) lower when compared to control group.

Serum Proteins

Total serum protein level increased ($P<0.05$) in treatment groups as compared to control group and the highest value was recorded in 0.5 per cent Shatavari supplemented group T_3(3.92 mg/dl) and the lowest in control group T_1(3.07 mg/dl) (Table 1 and Fig. 2). However, significant difference observed in T_3 when compared to T_1 and T_2 and T_3, T_4 was non-significantly comparable with T_2 and T_5. Similar findings were reported by Bhardwaj *et al.* (2009) that supplementation of SRP at 0.5, 1 and 1.5% level showed a significant increase in the serum total protein level. Rekhate *et al.* (2010), Dahale *et al.* (2014) also found the similar result. The higher levels of serum proteins might be due to the effect of herbal feed supplement which stimulated hepatic activities resulting in the release of enzyme *viz.*, phosphorylase and teansaminase that regulate the blood glucose and serum protein levels in the bio system Guyton (1991).

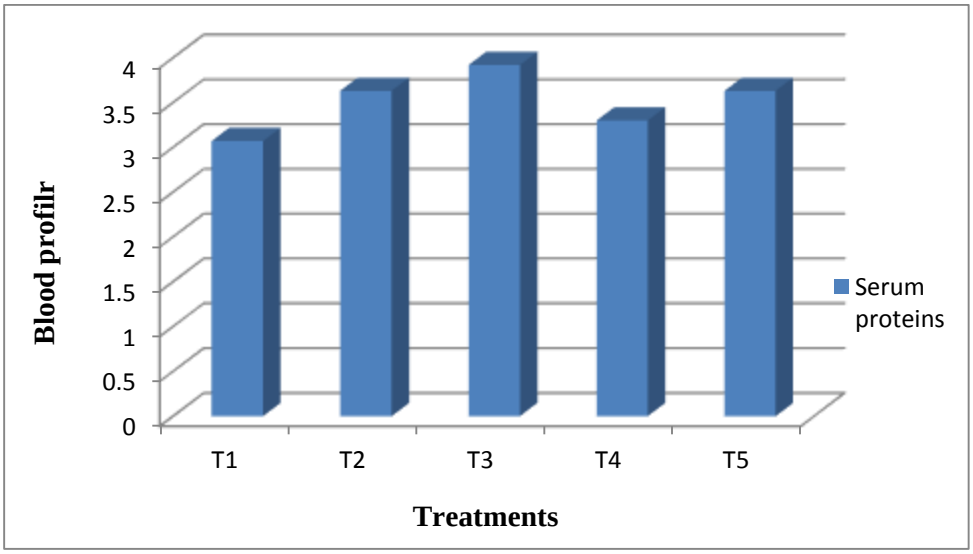

Fig. 2: Mean serum proteins values of Raja II broilers fed with different levels of Shatavari during 0 to 6 weeks

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Conclusion

The results of these investigations showed that the supplementation of shatavari improved total serum protein, serum cholesterol, LDL and HDL levels in treatment groups, however, the better response was found in terms of these biochemical parameters in treatment with combination of 0.5% shatavari root powder.

Acknowledgement

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