

Effect of Ashwagandha (*Withania somnifera*) on Haematology and Serum Biochemistry of Broiler Chicks

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Abstract

An experiment was conducted on 72 day old commercial broiler chicks (VenCob) to study the effect of *Withania somnifera* (Ashwagandha) powder on haematology and serum biochemistry of broiler chicks during 0-6 weeks of age. The chicks were randomly divided into four groups with three replication and each replication consisted of 6 birds. All the chicks were housed in deep litter system. The experimental diets were: no feed additive (T_0), 1.0 per cent Ashwagandha powder (T_1), 2.0 per cent Ashwagandha powder (T_2) and 3.0 per cent Ashwagandha powder (T_3). Results showed that glucose, Haemoglobin (Hb) and serum cholesterol, low density lipoprotein cholesterol level in T_1 and T_3 were significantly ($P < 0.05$) lower than T_0 . However cholesterol (mg/dl), high density lipoprotein (mgdl⁻¹) and total protein (gdl⁻¹) levels were found higher in all the three experimental groups. It was concluded that the inclusion of 1.0 and 3.0 per cent level of *Withania somnifera* powder in broiler ration as a herbal feed additive could be beneficial in improving blood biochemical profile of broilers.

Keywords : Ashwagandha, broilers, haematology and serum biochemistry.

Introduction

Withania somnifera, commonly known as Ashwagandha, is an important medicinal plant. It has been used in *Ayurvedic* and indigenous medicine for the last 3,000 years. The main constituents of *Withania somnifera* roots are alkaloids and steroidal lactone. Withanine, the main

alkaloid present in its roots and leaves, is responsible for its biological activity. The roots and leaves of *Withania somnifera* are used as drugs. Most of the herbal medicine are derived from the roots of the Ashwagandha (Ansari *et al.* 2013). It has anti-oxidative, anti-stress, anti-coccidial, immune-modulatory and anti-lipidemic effect. Moreover, it plays a vital role in lowering blood sugar, serum cholesterol and stress induced gastric indigestion and ulcers in human being (Muhammad *et al.* 2009). The present study was conducted to evaluate the effect of supplementation of *Withania somnifera* (Ashwagandha) on blood biochemical profile of broilers.

Material and Methods

The experiment was conducted at poultry unit of College of Agriculture, Dapoli, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Ratnagiri, Maharashtra located in Konkan, India. Seventy two days' old commercial broiler chicks were randomly divided into four groups with three replication with each replication having 6 birds having almost similar body weight. The birds were from the same hatch and were reared under uniform management condition up to seven weeks of age. All the birds irrespective of their treatments were fed maize crumble for first four days of their age, followed by experimental ration prepared as per *Bureau of Indian Standards*(1992) standard. The experimental ration prepared by adding 0, 1, 2 and 3 per cent Ashwagandha (*Withania somnifera*) powder in T_0 (control group), T_1 , T_2 and T_3 , respectively. At the end of the experiment 1 bird per replication (3 birds per treatment) were selected randomly to collect blood sample in EDTA containing test tubes (1mg EDTAml⁻¹ of blood) by wing veins. These anti-coagulated blood samples were subjected to determine hemoglobin (Campbell 1995), LDL

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Table 1 : Chemical composition of experimental feed ingredients (% DM basis).

Proximate Principle	DM	CP	NFE	EE	CF	TA
Broiler starter	91.24	21.28	65.65	4.56	6.59	1.92
Broiler finisher	88.96	19.34	68.55	4.73	5.63	1.75
Ashwagandha powder	62.30	1.25	77.66	2.04	3.41	6.78

DM- Dry matter, CP- Crude protein, NFE- Nitrogen Free Extract, EE- Ether Extract, CF- Crude fibre, TA- Total ash.

Table 2 : Effect of Ashwagandha on the blood serum properties of chicks (mg/dl).

Sr. No.	Attributes	T ₀	T ₁	T ₂	T ₃	SEm.
1.	Glucose	261.68	255.38	282.6	274.81	1.949
2.	Haemoglobin	10.7	9.79	10.45	11.5	0.42
3.	Serum protein	3.06	3.23	3.23	3.17	0.058
4.	LDL Cholesterol	34.36	43.95	47.29	31.18	1.032
5.	HDL cholesterol	57.66	69.05	74.33	75.42	1.991
6.	Triglyceride	81.983	145.00	123.71	112.42	3.0176
7.	Serum cholesterol	134.83 ^a	134.43 ^{ab}	125.60 ^{bc}	127.00 ^{ab}	2.8028

(Friedwald *et al.* 1972), HDL (Richmond 1973) and cholesterol and triglycerides (Godkar 1994). The data were analyzed using one way analysis of variance for testing the significance (Snedecor and Cochran 1994) of various parameters for different treatment groups.

Results and Discussion

The crude protein content of starter, finisher and Ashwagandha powder was 21.28, 19.34 and 1.25 per cent, respectively with crude fat content of 4.56, 4.73 and 2.04 per cent in that order (Table 1). The other nutrient contents of both rations were within normal range. Chemical composition of experimental rations was in accordance with BIS (1992) standards.

Glucose concentration : The total glucose concentration (Table 2) was significantly higher ($P < 0.05$) in T₃ than T₀. The higher value of total serum glucose concentration in experimental groups T₃, where *Withania somnifera* powder was added at the rate of 3.0 per cent was similar to the finding of a study performed by Lanjewar *et al.* (2009). The increase in blood sugar level as the dietary herbal increased was quite interesting because birds

generally maintain a high and relatively constant blood sugar level even in low feed intake (Liukkonen-Anttila 2001).

Serum haemoglobin: The serum haemoglobin concentration level are presented in Table 2. It was significantly lower ($P < 0.05$) in T₁ than T₀. The lower values of serum haemoglobin concentration in experimental groups T₁ where *Withania somnifera* root powder was added at the rate of 1.0 per cent was similar to the finding of a study performed by Kumari *et al.* (2015). In contrast with present findings, Raghavan *et al.* (2011) reported significantly increased haemoglobin concentration in broilers supplemented with Ashwagandha powder at the rate 0.5 and 1.0 per cent.

Serum protein: The total serum protein concentration (Table 2) was significantly lower ($P < 0.05$) in T₀ and T₃ as compared to T₁ and T₂. The lower values of total serum protein in experimental groups T₀ and T₃ where *Withania somnifera* root powder was added at the rate of 0.0 and 3.0 per cent, was similar to the finding of a study performed by Kumari *et al.* (2015). In contrast,

significant reduction in serum total protein level in broilers supplemented with *Withania somnifera* root powder was also reported (Ottalwar *et al.* 2015, Uyanik *et al.* 2001).

Cholesterol : Lower values of cholesterol (Table 2) were recorded for treatment groups T₂ and T₃ than T₀ and T₁. The cholesterol value recorded for treatment group T₂ and T₃ was the lowest as compared to T₀ and T₁ experimental group. However, there was no significant difference observed in the mean values cholesterol for broilers in all the experimental groups (Andallu *et al.* 2000, Dwivedi *et al.* 2000, Hemalatha *et al.* 2006, Visavadiya and Narasimhacharya 2006, Kale *et al.* 2016). Interestingly, Emadi *et al.* (2007) observed significant (P<0.05) increase in serum cholesterol levels in male broiler chickens. Serum cholesterol levels decreased progressively in treatment group than control, which suggest a general decrease in lipid mobilisation. Ashwagandha powder may have indirect inhibitory effects exerted at levels of 3hydroxy-3-methyl-glutaryl-coA reductase, a key enzyme in cholesterol biosynthesis (Ansari *et al.* 2013). Broilers in treatment group T₀ showed significantly lower (P<0.05) triglycerides value (Table 2) than the control (T₀) T₁, T₂ and T₃. Similar significant decrease in triglyceride was also reported earlier (Andallu *et al.* 2000, Dwivedi *et al.* 2000, Visavadiya and Narasimhacharya 2006).

At the end of the study the birds supplemented with 3.0 per cent of Ashwagandha per kg of feed had a significantly (P<0.05) lower LDL compared to normal birds and birds supplemented with 1.0 and 2.0 per cent of Ashwagandha kg⁻¹ of feed. The results of present study are in agreement with other results (Babu *et al.* 1997). The chicks in group T₀ showed lower values for HDL than T₁, T₂ and T₃ (Table 2). However, the differences for the HDL values were significant amongst treatment. These results are in accordance with Hemalatha *et al.* (2006) and Rajangam *et al.* (2009) while in contrast with Visavadiya and Narasimhacharya (2006) who recorded lower values of triglyceride, cholesterol and HDL as an effect of feeding *Withania somnifera* root powder.

Conclusion

Inclusion of 3.0 per cent level of Ashwagandha (*Withania somnifera*) powder in broiler ration as a herbal feed additive is beneficial for improving blood glucose, haemoglobin, and HDL cholesterol. Therefore, 3.0 per cent of Ashwagandha powder, more beneficial for maintaining blood biochemical profile, may be recommended.

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