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### Effect of supplementation of *Withania somnifera* on serum biochemistry of broiler chicken

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#### Abstract

An experiment was conducted in commercial broilers for a period of six weeks to study the effect of dietary supplementation of *Withania somnifera* and cyproheptadine on serum biochemistry of broiler chicken. 120 numbers of day old sex separated broiler chicks, were wing banded, weighed and randomly allotted to six treatment groups with two replicates of ten chicks each. The treatment groups consisted of group 1 [basal diet]; group 2 [basal diet + *Withania somnifera* 0.5% extract], group 3 [basal diet + *Withania somnifera* 1% extract], group 4 [basal diet+ cyproheptadine 1 mg/kg] group 5 [basal diet + cyproheptadine 1 mg/kg + *Withania somnifera* 0.5% extract] group 6 [basal diet + cyproheptadine 1 mg/kg + *Withania somnifera* 1% extract]. *Withania somnifera* either alone or in combination with cyproheptadine had no adverse effects on biochemical parameters of serum which proves that both *Withania somnifera* and cyproheptadine are neither hepatotoxic nor nephrotoxic as per dose rates used in this study.

Keywords: Broilers, biochemical, albumin, globulin, Withania somnifera, cyproheptadine

#### 1. Introduction

The important tool would be to alter gut function and microbial habitat using feed supplements. Synthetic compounds are eaten by around 80% of household pets for medication or growth promotion. Use of alternate food supplements for animal farming has improved as a result of ban on antibiotics in food. Alternative feed supplements include enzymes, probiotics, herbs and essential oils, immunostimulants, and oxalic compound. Anxiety, crowding, poor ventilation, high light levels, and seasonal changes, all leading to contemporary problems in chicken. "Ashwagandha, Queen of Ayurveda, Indian ginseng, and Winter cherry "are all nicknames for Withania somnifera. In the Ayurvedic and traditional healthcare systems, this is an important medicinal plant. Lower cost of production, reduced risk of toxicity, minimum health hazards and environment friendly (Devegowda, 1996)<sup>[2]</sup>. A lot of work was done in the area of plants improving chicken growth since early 1970s. For better weight gain and feed effectiveness, a range of drugs, hormones, probiotics, growth boosters, antibiotics, and antihistaminic drugs have indeed been tried. Dhenge et al. (2009)<sup>[3]</sup> evaluated the effect of Ashwagandha (Withania somnifera) root powder and Bhuineem (Andrographis paniculata) leaf powder on Haemato-biochemical profile. The supplementation of Ashwagandha alone and with Bhuineem shown significant increase in serum total protein and globulin level and nonsignificant increase in serum albumin level.

Hence, the present study was designed to evaluate the serum biochemistry of *Withania somnifera* alone and in combination with cyproheptadine in commercial broiler chicken.

#### 2. Materials and Method 2.1 Experimental design

120 numbers of day-old commercial broilers were purchased from commercial hatchery belonging to single hatch they were weighed, wing banded and randomly assigned to six treatment groups with two replicates of ten chicks each and group of experiments follows.

#### 2.2 Collection of data 2.2.1 Serum biochemistry

standard procedures.

Collected blood samples are clotted and centrifuged for 20 mins at 1500 rpm and sera samples are separated and stored in -20 °C and analysis of serum total protein, albumin, globulin, A/G ratio, total cholesterol, triglycerides, creatinine, uric acid, AST and ALT were done as per

Groups	Treatment	No. of Birds
Ι	Control (Fed only basal diet)	20
Π	Basal diet + <i>Withania somnifera</i> 0.5% extract (root powder)	20
III	Basal diet + <i>Withania somnifera</i> 1% extract (root powder)	20
IV	Basal diet + Cyproheptadine 1mg/kg body weight	20
v	Basal diet + Cyproheptadine 1mg/kg body weight + Withania somnifera 0.5% extract	20
VI	Basal diet + Cyproheptadine 1mg/kg body weight + Withania somnifera 1% extract	20
	120	

#### 2.3 Statistical analysis

Methods suggested by Snedecor and Cochran were used to analyse various biochemical parameters.

#### 3. Result

#### **3.1 Biochemical Parameters**

#### 3.1.1 Effect of Withania somnifera and cyproheptadine

### supplementation on serum total protein, albumin, globulin levels (g/dl), and A/G ratio of broilers

Groups I to VI determined the mean blood total protein, albumin, globulin levels, and A/G ratio of broilers after treatment with *Withania somnifera* and cyproheptadine. At the end of the six-week research, there were no significant differences between the groups on these characteristics. There were no significant variations in the mean serum albumin levels between the groups.

## **3.1.2** Effect of *Withania somnifera* and cyproheptadine supplementation on serum total cholesterol, triglycerides, serum creatinine, and uric acid levels (mg/dl) broilers

At the end of the sixth week, the mean blood total cholesterol (mg/dl) in groups I to VI was  $127.27\pm5.18$ ,  $153.50\pm1.99$ ,  $164.74\pm3.41$ ,  $148.93\pm2.63$ , and  $154.77\pm4.20$ , respectively. Except for group VI, group IV showed a substantially greater (p 0.05) serum total cholesterol level than the other groups. The mean serum creatinine readings did not differ significantly across groups.

**Table 1:** Effect of supplementation of Withania somnifera and cyproheptadine on (mean  $\pm$  S.E.) serum total protein, albumin, globulin levels(g/dl) and A/G ratio of broilers

Treatment	Total protein (g/dl)	Albumin (g/dl)	Globulin (g/dl)	A/G ratio
Group I	4.20±0.09	2.62±0.16	1.62±0.18	1.76±0.22
Group II	3.97±0.17	2.47±0.11	1.50±0.20	1.77±0.22
Group III	4.19±0.15	2.48±0.08	1.71±0.18	1.61±0.30
Group IV	4.32±0.28	2.52±0.12	1.81±0.39	1.72±0.33
Group V	3.99±0.15	2.54±0.04	1.45±0.16	1.86±0.21
Group VI	3.94±0.11	2.54±0.09	1.41±0.14	1.92±0.25

Total protein, albumin, globulin levels (g/dl) and A/G ratio of broilers

## **3.1.3** Effect of *Withania somnifera* and cyproheptadine supplementation on serum total cholesterol, triglycerides, serum creatinine, and uric acid levels (mg/dl) broilers

At the end of the sixth week, the mean blood total cholesterol (mg/dl) in groups I to VI was  $127.27\pm5.18$ ,  $153.50\pm1.99$ ,  $151.57\pm3.41$ ,  $164.74\pm2.37$ ,  $148.93\pm2.63$ , and  $154.77\pm4.20$ ,

respectively. Except for group VI, Group IV showed considerably higher (p 0.05) serum total cholesterol levels than the other groups. The mean serum creatinine readings showed no significant variations between groups. Neither group IV nor the other groups differed considerably from group V.

**Table 2:** Effect of supplementation of Withania somnifera and cyproheptadine on (mean  $\pm$  S.E.) serum total cholesterol, triglycerides, creatinineand uric acid levels (mg/dl) of broilers

Treatment	Total cholesterol (mg/dl)	Triglycerides (mg/d)l	Creatinine (mg/dl)	Uric acid (mg/dl)
Group I	127.27 <sup>a</sup> ±5.18	151.40 <sup>a</sup> ±3.99	0.76±0.02	6.05 <sup>ab</sup> ±0.95
Group II	153.50 <sup>b</sup> ±1.99	155.53 <sup>a</sup> ±4.82	0.71±0.01	5.42 <sup>ab</sup> ±0.18
Group III	151.57 <sup>b</sup> ±3.41	162.33 <sup>a</sup> ±2.78	0.70±0.01	5.21 <sup>ab</sup> ±0.22
Group IV	164.74°±2.37	180.25 <sup>b</sup> ±4.08	0.73±0.03	6.55 <sup>b</sup> ±0.72
Group V	148.93 <sup>b</sup> ±2.63	166.43 <sup>ab</sup> ±2.86	0.73±0.07	4.97 <sup>ab</sup> ±0.47
Group VI	154.77 <sup>bc</sup> ±4.20	162.25 <sup>a</sup> ±10.17	0.77±0.04	4.61ª±0.53

**3.1.4** Effect of *Withania somnifera* and cyproheptadine supplementation on serum aspartate aminotransferase (AST) and alanine aminotransferase (ALT) levels (units/ml) of broilers

There were no notable differences between the groups at the end of the sixth week, the mean serum alanine aminotransferase (ALT) (units/ml) and serum aspartate aminotransferase (AST) in groups I to VI.

 Table 3: Effect of Withania somnifera and cyproheptadine supplementation on serum aspartate aminotransferase (AST) and alanine aminotransferase (ALT) levels (units/ml) of broilers

Treatment	AST (units/ml)	ALT (units/ml)	
Group I	141.37±0.43	46.95±0.05	
Group II	141.71±0.03	46.77±0.07	
Group III	141.71±0.06	46.97±0.08	
Group IV	141.39±0.30	46.91±0.03	
Group V	140.77±0.38	46.94±0.00	
Group VI	141.45±0.35	46.96±0.09	

Value given in each cell is the mean of six observations

#### 4. Discussion

The outcome of this study indicated that supplementation of Withania somnifera either alone or in combination with cyproheptadine had no significant difference in serum total protein, albumin, globulin and A/G ratio, serum total cholesterol, triglycerides, creatinine and uric acid levels. Srivastava et al. (2012) [4] investigated the effect of supplementation of indigenous herbal drug (Withania somnifera, Asparagus racemosus, Mucuna pruriens) in diets on performance and blood parameters in broilers. There was no significant difference for SGOT, SGPT, serum protein, and serum glucose and serum urea between the treatments. Arivuchelvan et al. (2013) [1] evaluated the effect of supplementation of Withania somnifera on serum biochemical parameters in broilers, the results of the study revealed that the groups treated with Withania somnifera alone showed no significant effects of the serum biochemical parameters.

#### 5. Conclusion

*Withania somnifera* either alone or in combination with cyproheptadine had no adverse effects on serum biochemical parameters of broiler chicken and hence it proves that both *Withania somnifera* and cyproheptadine are neither hepatotoxic nor nephrotoxic in nature.

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