



ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; 11(6): 173-175
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www.thepharmajournal.com
Received: 06-02-2022
Accepted: 16-04-2022

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Immuno-modulatory effects of Supplementation of *Withania somnifera* and Cyproheptadine in Broilers

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Abstract

An experiment was conducted in commercial broilers for a period of six weeks to study the immuno-modulatory effects of dietary supplementation of *Withania somnifera* and cyproheptadine either alone or in combination.

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 I [basal diet]; group 2 [basal diet + *Withania somnifera* 0.5% extract], group 3 [basal diet + *Withania somnifera* 1% extract], group 4 [basal diet + cyproheptadine 1mg /kg] group 5 [basal diet + cyproheptadine 1mg /kg + *Withania somnifera* 0.5% extract] group 6 [basal diet + cyproheptadine 1mg/kg + *Withania somnifera* 1% extract]. Antibodies titers against ND were significantly higher in all treatment groups as compared to the values shown by the broilers in control group. Findings of this study indicated that administration of *Withania somnifera* root powder to broiler chickens improve their immunological status.

Keywords: *Withania somnifera*, Cyproheptadine, Immunity

1. Introduction

Antibiotic resistance and the ban of antibiotics as feed additives has accelerated the usage of alternative feed additives like enzymes, probiotics, herbs, essential oils, Immunostimulants and organic acids. Current problems in poultry are caused by combinations of factors such as management, stress, nutrition, overcrowding, poor ventilation, high intensity of light and seasonal changes. *Withania somnifera* is also known as Ashwagandha, Queen of Ayurveda, Indian ginseng, and Winter cherry. It has been an important herb in the ayurvedic and indigenous medication for over 3000 years. Mushtaq *et al.* (2012) [2] conducted a study to determine the effect of *Withania somnifera* on haematological and immunological profile of broiler chicks. Findings of the study suggested that *Withania somnifera* extract at 20g/l of drinking water improved the immunological status of the birds. Rohatash *et al.* (2012) [4] evaluated the efficacy of Ashwagandha (*Withania somnifera*) supplementation on haematological and immunological parameters of Japanese quails. The study suggested that supplementation of *Withana somnifera* root powder at inclusion rate of 1 per cent had significant effect on immune status of the birds. Indigenous medicinal plants *viz.*, *Withania somnifera*, *Ocimum sanctum*, *Phyllanthus emblica*, *Mangifera indica* and *Shilajit* that effectively fight stress by possessing adaptogenic, haemopoietic, immunomodulating, growth promoting, antioxidant and rejuvenating actions (Ather, 1999) [1]. Hence, the present study was delineate to evaluate the Immuno-modulatory effects of *Withania somnifera* alone and in combination with cyproheptadine in commercial broiler chicken.

2. Materials and Method

2.1 Experimental design

One hundred twenty, day-old commercial broiler chicks 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 for each group and experiments was conducted as follows.

Table 1: Show the treatment of birds

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

2.2 Health care

The experimental broiler chicks were vaccinated against NewCastle disease virus and Infectious bursal disease virus as per the following schedule:

Table 2: Vaccine Route of administration

Age (in days)	Vaccine	Route of administration
7	NewCastle disease vaccine (F strain)	Intra-Occular
14	Infectious bursal disease vaccine (Georgia live strain)	Intra-Occular
21	NewCastle disease vaccine (LaSota strain)	Intra-Occular

2.3 Collection of data

2.3.1 Immunity against NewCastle disease virus

Haemagglutination inhibition (HI) titre against NewCastle antigen was estimated to assess the immunity against NewCastle disease virus at weekly interval.

Table 3: Effect of supplementation of *Withania somnifera* and cyproheptadine on (mean \pm S.E.) HI Titre (log 2) against ND virus of broilers

Treatment	First week	Second wee	Third week	Fourth week	Fifth week	Sixth week
Group I	1.58 \pm 0.0	1.72a \pm 0.09	1.58 \pm 0.00	1.58a \pm 0.00	1.58a \pm 0.0	1.65ab \pm 0.07
Group II	1.58 \pm 0.0	2.31b \pm 0.08	1.70 \pm 0.12	1.84b \pm 0.13	1.72b \pm 0.09	1.65ab \pm 0.07
Group III	1.58 \pm 0.0	1.58a \pm 0.00	1.65 \pm 0.07	1.58a \pm 0.00	1.58a \pm 0.0	1.72ab \pm 0.09
Group IV	1.58 \pm 0.0	1.58a \pm 0.00	1.58 \pm 0.00	1.58a \pm 0.00	1.58a \pm 0.0	1.58a \pm 0.00
Group V	1.58 \pm 0.0	1.72a \pm 0.09	1.65 \pm 0.07	1.65ab \pm 0.07	1.58a \pm 0.0	1.94b \pm 0.18
Group VI	1.58 \pm 0.0	1.58a \pm 0.00	1.70 \pm 0.12	1.65ab \pm 0.07	1.58a \pm 0.0	1.72ab \pm 0.09

3.1.2 Effect of supplementation of *Withania somnifera* and cyproheptadine on relative weight of lymphoid organs of broilers:

The mean weight of spleen for the groups I to VI at the end of sixth week were 0.10 \pm 0.01, 0.09 \pm 0.02, 0.13 \pm 0.02, 0.08 \pm 0.01, 0.06 \pm 0.01 and 0.13 \pm 0.04 percent, respectively. Group III and VI had significantly ($p < 0.05$) higher spleen weight than group V, whereas groups i.e. I, II and IV did not differ significantly from other groups.

Table 4: Effect of supplementation of *Withania somnifera* and cyproheptadine on (mean \pm S.E.) relative weight of lymphoid organs of broilers.

Treatment	Spleen (%)	Thymus (%)	Bursa (%)
Group I	0.10ab \pm 0.01	0.27 \pm 0.03	0.05 \pm 0.01
Group II	0.09ab \pm 0.02	0.27 \pm 0.04	0.06 \pm 0.01
Group III	0.13b \pm 0.02	0.31 \pm 0.04	0.07 \pm 0.01
Group IV	0.08ab \pm 0.01	0.28 \pm 0.06	0.05 \pm 0.01
Group V	0.06a \pm 0.01	0.30 \pm 0.04	0.05 \pm 0.01
Group VI	0.13b \pm 0.04	0.32 \pm 0.02	0.05 0.01

4. Discussion

The outcome of this study indicated that *Withania somnifera* root powder improves immunological status of broiler chicken. Rekha *et al.* (2011) [3] conducted a research to investigate the

2.3.2 Weight of lymphoid organs

The weight of lymphoid organs *viz.*, spleen, thymus and bursa were recorded at the end of the experiment by slaughtering the birds.

2.4 Statistical analysis

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

3. Result

3.1 Immunological parameters

3.1.1 Effect of supplementation of *Withania somnifera* and cyproheptadine on HI titre (log2) against ND virus of broilers.

The HI titre of groups I to VI at first and third week, no significant differences were observed. Group II had significantly higher titre than the other groups in Second, fourth and fifth week. Group V had significantly higher ($p < 0.05$) HI titre than group IV in sixth week. All the other groups i.e. I, II, III and VI did not differ significantly either from group V or from group IV.

The mean weight of thymus for the groups I to VI at the end of sixth week were 0.27 \pm 0.03, 0.27 \pm 0.04, 0.31 \pm 0.04, 0.28 \pm 0.06, 0.30 \pm 0.04, 0.32 \pm 0.02 per cent, respectively. No significant differences were observed among the groups.

The mean weight of bursa for the groups I to VI at the end of sixth week were 0.05 \pm 0.01, 0.06 \pm 0.01, 0.07 \pm 0.01, 0.05 \pm 0.01, 0.05 \pm 0.01 and 0.05 \pm 0.01 per cent, respectively. No significant differences were observed among the groups.

effect of Ashwagandha on growth performance in broiler chicken and found that Ashwagandha formulation improved production performance as well as immune status of birds.

5. Conclusion

The present study was undertaken to evaluate the Immunological status of *Withania somnifera* and cyproheptadine alone and in combination in broiler chickens. This study proved that the use of *Withania somnifera* dried root powder in a specific dose during the scheduled period showed significant immune responses in broiler chicks. Whereas the dietary supplementation of cyproheptadine has no effect on the immune status of the broilers.

6. Reference

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