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Sambandhan
Department of Veterinary
Pharmacology and Toxicology,
Veterinary College and Research
Institute, Namakkal,
Tamil Nadu, India

A Jagadeeswaran
Department of Veterinary
Pharmacology and Toxicology,
Veterinary College and Research
Institute, Namakkal,
Tamil Nadu, India

Arivuchelvan
Department of Veterinary
Pharmacology and Toxicology,
Veterinary College and Research
Institute, Namakkal,
Tamil Nadu, India

Shamudeen
Department of Veterinary
Pharmacology and Toxicology,
Veterinary College and Research
Institute, Namakkal,
Tamil Nadu, India

Arivazhagan
Department of Veterinary
Pharmacology and Toxicology,
Veterinary College and Research
Institute, Namakkal,
Tamil Nadu, India

Balaguru
Department of Veterinary
Pharmacology and Toxicology,
Veterinary College and Research
Institute, Namakkal,
Tamil Nadu, India

Corresponding Author
Sambandhan
Department of Veterinary
Pharmacology and Toxicology,
Veterinary College and Research
Institute, Namakkal,
Tamil Nadu, India

Effect of supplementation of *Withania somnifera* and cyproheptadine on growth performance of broiler chicken

Sambandhan, A Jagadeeswaran, Arivuchelvan, Shamudeen, Arivazhagan and Balaguru

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 either alone or in combination on the production performance.

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]. As a result of supplementation of *withania somifera* and cyproheptadine in broiler diet increases the body weight [$p<0.05$] in the first, second, third week and fifth week but fourth and sixth week treatment groups did not differ from control group. No significant differences were observed among the groups in body weight gain at first to sixth week of age. Feed conversion ratio of groups III, IV and V did not differ significantly either from group I and VI or group II. The cumulative feed consumption (g) of groups sixth week Group VI had significantly higher ($p<0.05$) cumulative feed consumption. Dietary supplementation of *Withania somnifera* either alone or in combination with cyproheptadine could increase the production performance.

Keywords: Body weight, feed intake, body weight gain, feed conversion ratio *Withania somnifera*, cyproheptadine

1. Introduction

The current trend in meat industry is production of lean meat and meat animals with better feed efficiency. Demand for poultry meat has increased due to rise in price of all other meats. From the early seventies lot of researches/experiments had been conducted regarding growth promotion in poultry. Many drugs, hormones, probiotics, growth promoters, antibiotics and certain antihistaminic agents have been constantly used for improvement in growth and better feed efficiency.

A number of feed additives including antibiotics have been widely employed in poultry industry for several decades. The most important factor in growth promotion is the manipulation of gut function and micro flora with feed additives. Approximately 80 percent of domestic animals intake synthetic compounds for medication or growth promotion. The ban of antibiotics as feed additives and antibiotic resistance has accelerated the usage of alternative feed additives in animal production like enzymes, probiotics, herbs, essential oils, Immunostimulants and organic acids as feed additives. 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 medical system for over 3000 years. Lower cost of production, reduced risk of toxicity, minimum health hazards and environment friendliness (Devegowda, 1996) [2]. These products have also been indicated to exert immunomodulatory action which confers birds with better immune response for various diseases, disorders and tolerance against toxins leading to lower mortality and morbidity and enhanced productivity (Panda and Chawak, 1996) [5]. Growth hormone (somatotropin) has no effect following oral administration. further long term administration causes osteochondrosis in animals (Evock *et al.*, 1981) [3].

In order to overcome these side effects, cyproheptadine, an antagonist at both serotonin and histamine receptors, has been used to increase appetite and promote weight gain in humans. Hence, the present study was designed to evaluate the growth promoting 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 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.

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	20
VI	Basal diet + Cyproheptadine 1mg/kg body weight + <i>Withania somnifera</i> 1% extract	20
Total		120

2.2 Collection of data

Body weight, Body weight gain, feed consumption and feed efficiency data were recorded on weekly basis.

2.3 Statistical analysis

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

3. Result

3.1 Growth rate

Effect of *Withania somnifera* and Cyproheptadine supplementation on broilers body weight (g)

With the supplementation of *Withania somnifera* and Cyproheptadine along with basal diet, the body weight gain (g) of broilers in groups I to VI at the end of the first week, second and third week all of the treatment groups had gained considerably more weight ($P < 0.05$) than the control group. At the end of fourth, fourth and sixth week, there were no significant differences between the groups. In fifth week, group V had significant different from control group of broilers body weight.

3.1.1 Effects on body weight gain (g) of broilers

With the supplementation of *Withania somnifera* and

Cyproheptadine along with basal diet, the body weight gain (g) of broilers in groups I to VI at the end of the first, second and third week, all of the treatment groups had gained considerably more weight gain ($P < 0.05$) than the control group. At the end of fourth, fifth and sixth week, there were no significant differences between the groups

3.1.2 Effects on cumulative feed consumption (g)

With the supplementation of *Withania somnifera* and Cyproheptadine along with basal diet, the cumulative feed consumption (g) of broilers in groups I to VI, at the end of the first, second and third, fourth and fifth week, No significant differences were observed in cumulative feed consumption. At sixth week, group VI and group II had higher cumulative feed consumption than all other groups. Among them group VI had higher significance ($p < 0.05$) than group II.

3.1.3 Effect of cumulative feed conversion ratio

With the supplementation of *Withania somnifera* and Cyproheptadine along with basal diet, the feed conversion ratio of birds in groups I to VI at the end of the first, second, third, fourth and fifth week, Of all the treatments No significant differences were observed. At 6th week, groups II had significantly lower ($p < 0.05$) feed conversion ratio.

Table 1: Effect of supplementation of *Withania somnifera* and cyproheptadine on (mean \pm S.E.) body weight (g) of broilers

Treatment	Day old	First week	Second week	Third week	Fourth week	Fifth week	Sixth week
Group I	50.33 \pm 0.79	160.95 ^a \pm 7.33	395.50 ^a \pm 9.76	737.15 ^a \pm 18.67	1235.00 \pm 64.07	1758.45 ^a \pm 42.71	2275.95 \pm 59.52
Group II	51.03 \pm 0.78	174.25 ^b \pm 5.46	427.00 ^b \pm 6.61	792.30 ^b \pm 15.37	1247.75 \pm 25.93	1850.55 ^{ab} \pm 43.07	2401.60 \pm 59.28
Group III	49.90 \pm 1.03	175.55 ^b \pm 3.35	426.15 ^b \pm 7.86	791.45 ^b \pm 14.13	1204.55 \pm 25.20	1790.50 ^{ab} \pm 37.41	2342.50 \pm 54.18
Group IV	50.85 \pm 0.83	178.85 ^b \pm 2.69	438.80 ^b \pm 4.83	802.85 ^b \pm 15.40	1226.10 \pm 21.58	1829.45 ^{ab} \pm 32.68	2340.90 \pm 71.84
Group V	50.98 \pm 0.67	175.70 ^b \pm 3.95	435.50 ^b \pm 7.51	811.60 ^b \pm 11.37	1285.40 \pm 20.83	1915.75 ^b \pm 41.68	2445.15 \pm 60.96
Group VI	49.80 \pm 0.81	179.90 ^b \pm 3.01	441.85 ^b \pm 8.26	767.00 ^{ab} \pm 17.95	1234.10 \pm 32.89	1860.00 ^{ab} \pm 55.50	2422.55 \pm 70.33

Values given in each cell is the mean of twenty observations.

Means with in a column with different superscript differ significantly ($p < 0.05$).

Table 2: Effect of supplementation of *Withania somnifera* and cyproheptadine on (mean \pm S.E.) body weight gain (g) of broilers

Treatment	First week	Second week	Third week	Fourth week	Fifth week	Sixth week
Group I	110.6 ^a \pm 7.1	345.2 ^a \pm 9.6	686.8 ^a \pm 18.5	1184.7 \pm 63.9	1708.1 ^a \pm 42.5	2225.6 \pm 59.3
Group II	123.2 ^b \pm 5.4	376.0 ^b \pm 6.5	741.3 ^b \pm 15.2	1196.7 \pm 25.8	1799.5 ^{ab} \pm 42.9	2350.6 \pm 59.2
Group III	125.7 ^b \pm 2.9	376.3 ^b \pm 7.3	741.6 ^b \pm 13.8	1154.7 \pm 24.5	1740.6 ^{ab} \pm 36.7	2292.6 \pm 53.5
Group IV	128.0 ^b \pm 2.4	388.0 ^b \pm 4.7	752.0 ^b \pm 15.2	1175.3 \pm 21.3	1778.6 ^{ab} \pm 32.6	2290.1 \pm 71.9
Group V	124.7 ^b \pm 3.7	384.5 ^b \pm 7.3	760.6 ^b \pm 11.3	1234.4 \pm 20.7	1864.8 ^b \pm 41.6	2394.2 \pm 60.9
Group VI	130.1 ^b \pm 2.9	392.1 ^b \pm 8.1	717.2 ^b \pm 17.8	1184.3 \pm 32.7	1810.2 ^{ab} \pm 55.4	2372.8 \pm 70.1

Values given in each cell is the mean of twenty observations.

Means with in a column with different superscript differ significantly ($p < 0.05$).

Table 3: Effect of supplementation of *Withania somnifera* and cyproheptadine on (mean \pm S.E.) cumulative feed consumption (g) of broilers

Treatment	First week	Second week	Third week	Fourth week	Fifth week	Sixth week
Group I	145.45 ^a \pm 2.55	478.50 \pm 9.50	1048.00 \pm 16.00	1834.00 \pm 22.00	2942.00 \pm 45.00	4081.50 ^{ab} \pm 50.50
Group II	153.90 ^b \pm 0.10	493.85 \pm 1.45	1055.00 \pm 32.00	1884.75 \pm 20.55	2943.80 \pm 42.00	3974.20 ^a \pm 22.20
Group III	153.55 ^b \pm 0.75	500.30 \pm 7.20	1104.45 \pm 41.95	1901.65 \pm 61.55	3063.55 \pm 55.05	4156.20 ^{ab} \pm 80.20
Group IV	154.15 ^b \pm 2.15	502.75 \pm 8.45	1122.25 \pm 19.75	1934.30 \pm 55.20	3044.65 \pm 20.35	4184.50 ^{ab} \pm 102.50
Group V	156.20 ^b \pm 0.10	497.35 \pm 2.65	1090.55 \pm 6.85	1885.55 \pm 50.15	3048.75 \pm 5.35	4093.60 ^{ab} \pm 7.60
Group VI	152.35 ^{ab} \pm 3.85	504.70 \pm 11.80	1100.00 \pm 2.00	1932.00 \pm 44.00	3070.50 \pm 27.50	4267.50 ^b \pm 44.50

Value given in each cell is the mean of two observations

Means with in a column with different superscript differ significantly ($p < 0.05$)

Table 4: Effect of supplementation of *Withania somnifera* and cyproheptadine on (mean \pm S.E.) Cumulative feed conversion ratio of broiler

Treatment	First week	Second week	Third week	Fourth week	Fifth week	Sixth week
Group I	1.25 \pm 0.03	1.39 \pm 0.02	1.55 \pm 0.05	1.61 \pm 0.04	1.73 ^{ab} \pm 0.03	1.85 ^b \pm 0.01
Group II	1.29 \pm 0.01	1.38 \pm 0.00	1.48 \pm 0.05	1.58 \pm 0.02	1.68 ^a \pm 0.02	1.75 ^a \pm 0.02
Group III	1.27 \pm 0.00	1.37 \pm 0.02	1.53 \pm 0.06	1.61 \pm 0.08	1.75 ^{ab} \pm 0.04	1.82 ^{ab} \pm 0.03
Group IV	1.26 \pm 0.02	1.34 \pm 0.00	1.57 \pm 0.00	1.64 \pm 0.05	1.76 ^b \pm 0.01	1.83 ^{ab} \pm 0.04
Group V	1.27 \pm 0.00	1.34 \pm 0.01	1.50 \pm 0.00	1.59 \pm 0.08	1.72 ^{ab} \pm 0.00	1.81 ^{ab} \pm 0.02
Group VI	1.23 \pm 0.03	1.34 \pm 0.03	1.50 \pm 0.00	1.63 \pm 0.03	1.73 ^{ab} \pm 0.01	1.84 ^b \pm 0.02

Value given in each cell is the mean of two observations

Means with in a column with different superscript differ significantly ($p < 0.05$).

4. Discussion

The outcome of this study indicated that ashwagandha root powder and cyproheptadine improved weight gain, feed consumption. Cyproheptadine treated groups (either alone or in combination with *Withania somnifera*) consumed more feed. Cyproheptadine antagonizes the satiety stimulating effects of serotonin on the satiety Centre. The results of the present study are in accordance with Narayanasamy and Santhoshkumar (2005), Rekha *et al.* (2011) [6], who also recorded improved growth in broiler treated with *Withania somnifera*. Similar findings were also observed by Choudhari *et al.* (2006) [1] and Rohatash *et al.* (2012) [7] also recorded higher body weights in group of broilers, treated on poly herbal formulations containing *Withania somnifera*. Thus Cyproheptadine can be used as growth promoter and *Withania somnifera* to get better economic returns in broiler production.

5. Conclusion

The present study was undertaken to evaluate the growth promoting effect of *Withania somnifera* and cyproheptadine alone and in combination in broiler chicken. It improves feed intake, body weight gain, feed consumption and feed conversion ratio of the birds. In this view the beneficial effects of *Withania somnifera* and cyproheptadine endorse its use in poultry to ameliorate, its productivity in future.

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