

Hematological and Growth Performance Studies after *Withania Somnifera* Supplementation in Broilers

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Abstract

This research was made to study the influence of addition of powdered root of Ashwaganda (*Withania somnifera*) on general health condition (growth performance) as well as hematological profile of broiler chicks. A 100 broiler chicks at first day after hatching were obtained from Wadi Company, Egypt, and were distributed at random into four equal groups. The first group received control ration only and kept as control group (Gr 1), the 2nd (Gr 2), 3rd (Gr 3) and 4th (Gr 4) groups received control ration + 0.5%, 1% and 1.5% *Withania somnifera* root powder respectively for 42 days. Body weights, body weight gain, feed intake and feed efficiency were recorded on regular basis and hematological profile of the birds was estimated at the end of the 4th and 6th weeks of the research. Results showed that body weight and weight gain were significantly increased ($P < 0.05$) in Gr2 and Gr3. While Gr4 showed non-significant changes in comparison with control group. Feed intake and feed efficiency were significantly decreased ($P < 0.05$) in Gr2 and Gr3. While Gr4 showed non-significant changes in comparison with control group. Hematological results showed significant ($P < 0.05$) rise in RBCs, PCV as well as Hb concentration in Gr2 and Gr3. While Gr4 showed non-significant changes in comparison with control group. Regarding to MCV (fl), MCH (pg) and MCHC (%) there were non-significant changes in all groups supplemented by *Withania somnifera* powdered root 0.5, 1 and 1.5% in comparison with control group. There were significant increase ($P < 0.05$) in total leukocytic count and absolute numbers of lymphocytes in Gr2 and Gr3 over control group. These results indicate that addition of 0.5 and 1% *Withania somnifera* powdered root significantly enhanced general health condition (growth performance) as well as hematological profile of broiler chicks.

Introduction

Poultry Production is one of the most critical and quickest

developing industries in Egypt today. It gives essential source of high-quality animal and of relative

minimal cost in contrast with other meat. It is a decent wellspring of live hood for family subsistence since it requires less capital investment contrasted with other domestic animals. However the constant ascent in the cost of medicines influence local broiler producers. This has driven a lot of poultry and plant specialists to search for alternative source to take care of this issue. Medicinal plants are one of them.

One of these Medicinal plants is *Withania somnifera* that otherwise called "Ashwagandha" or Indian ginseng and winter cherry. *Withania somnifera* is an Indian plant that has good medical properties having a place with family Solanaceae. *Withania somnifera* plays a vital part in the Traditional medicine of South East Asia. Species of *Withania* are broadly disseminated in dry places of tropical and subtropical areas (*Mirjalili et al., 2009*). Ashwagandha is utilized as a good treatment against microbes, oxidantion, inflammation, tumor, hyperglycemia and hepatotoxicity (*Rastogi and Mehrotra, 1998*).

Withania somnifera is complicated in its chemical structure and above 80 chemical elements are found in its structure (*van Wyk et al., 2000*). Roots of *Ashwagandha* contain more than 35 ingredients (*Rastogi and Mehrotra., 1998*). The biologically active ingredients are alkaloids (isopellertierine, anferine), steroidal lactones (withanolides, withaferins), saponins comprising

an addition acyl bunch (sitoindoside VII and VIII), and withanoloides has a glucose attached to carbon 27 (sitonidoside XI and X). Ashwagandha is likewise rich in iron (*Mirjalili et al., 2009*). Ashwagandha comprises basically of withanolides that found in its root and are accepted to represent its unprecedented therapeutic properties involving immune function and considerably tumor (*Grandhi, 1994*).

Medicinal plants can be added to animal's ration to enhance their body weight and weight gain, improve their ability in converting feed mass into the desired output, prolong their life, and decrease their mortality. From other studies, it was showed that addition of *Withania somnifera* powdered root to the diet significantly enhanced all growth parameters (live body weight, weekly gain in body weight as well as feed efficiency) of birds *Mishra and Singh (2000)*, *Samarth et al (2002)*, *Pedulwar et al (2007)*, *Shisodiya et al (2008)*, *Ansari et al (2008)*, *Choudhari et al (2008)*, *Jadhav et al (2008)*, *Muhammad et al (2011)* and *Rohatash et al (2012)*.

Mice that given extract that extracted from Ashwagandha showed significant rise in their hemoglobin concentration beside increased erythrocyte counts and leukocytes, thrombocytes as well as body mass in comparison with unsupplemented group (*Ziauddin et al., 1996*). Moreover there was

significant increasing in the TLC on the 10th day in mice injected (intraperitoneally) for 5 days with 70% methanol extract from root powder of Ashwagandha at the dose of 20 mg per animal (*Davis and Kuttan, 2000*). Also it has been showed that Addition of Ashwagandha aqueous extract to chicken's drinking water for five weeks to four groups; the first group was given Ashwagandha aqueous extract at 0 g/L, the second group was given Ashwagandha aqueous extract at 10 g/L, the third group was given Ashwagandha aqueous extract at 20 and the fourth group was given Ashwagandha aqueous extract at 30 g/L, led to rise in hemoglobin, Packed cell volume and leucocytes in supplemented groups. No changes reported in the differential leukocytic count in supplemented in comparison with unsupplemented group (*Muhammad et al., 2011*).

Materials and methods

1-The Medicinal plant

Collection and processing of *Withania somnifera*:

Roots of *Withania somnifera* were gathered from Faculty of Agriculture, Mansoura University. These roots were rinsed with distilled water thoroughly and left to dry in the air under shade. Dried roots were then crushed in mixer grinder into powdered form.

2-Experimental design:

100 broiler chicks (Ross 308) at first day after hatching were

obtained from Wadi Company, Egypt, reared on deep litter. All chickens were vaccinated against Newcastle disease at 7 , 13 and 26 days old and against Gumboro disease at 15 and 24 days old (*Giambrone and Ronald, 1986*). All chicks were given commercial broiler starter basal ration from 1st day till 3 weeks of age, then grower finisher ration were used till 42 days of age. The ration was formulated to meet the nutritional requirements as suggested by the *NRC (1994), Table (1)*.

Broiler chicks were distributed at random into four equal groups. The first group received control ration only and kept as control group (Gr 1), the 2nd (Gr 2) ,3rd (Gr 3) and 4th (Gr 4) groups received control ration + 0.5%, 1% and 1.5% *Withania somnifera* root powder respectively. These diets were given *ad libitum* up to 42 days. Body weight and feed intake were registered every week and body gain and feed efficiency were then calculated. 5 chicks are picked up randomly from all groups and blood samples were taken from wing vein after 28 and 42 days post treatment to assess erythrocytic and leukocytic count by manual method according to *Feldman et al., (2000)* using improved Neubauer hemocytometer and diluting fluid of erythrocytes and leukocytes, haemoglobin that was estimated spectrophotometrically using the cyanomethaemoglobin method after centrifugation, according to

Drabkin (1949), packed cell volume (PCV) by the microhaematocrite apparatus centrifuge by using microhaematocrite capillary tube, according to *Barba (1988)*. Red cell indices, MCV (fl), MCH (pg) and MCHC (%) were calculated from measured PCV %, Hb concentration and RBCs count according to *Feldman et al., (2000)*.

Differential Leukocytic count: Blood films were performed immediately after the blood sample is collected, by manual method. Two blood films were performed

from each blood sample. Blood films were stained by Giemsa stain and differential Leukocytic count was performed according to *Feldman et al., (2000)*.

Statistical analysis:

Data collected from the hematological analysis of treated groups of chicks were statistically analyzed in compare to control group for the mean and standard error. Significance of the results was evaluated by calculating the ANOVA (F-test) according to *Tamhane and Dunlop (2000)*.

Table (1): *The composition of the basal ration*

Ingredients	Starter (0-3 weeks) %	Grower-finisher (4-6 weeks)%
Ground yellow corn	56.7	66.6
Soya bean meal	29.5	23.53
Fish meal	7.0	5.0
Soya bean oil	4.06	2.02
Dicalcium phosphate	0.88	0.6
Limestone	1.26	1.69
dl-Methionine (purity96%)	0.1	0.06
Iodized sodium chloroxide	0.25	0.25
Vitamins& mineral premix	0.25	0.25
Calculated composition		
Crude protein	22.0	19.0
ME kcal per kg	3060.0	3040.0
Calorie/protein ratio(C/P)	139.0	160.0
Cadmium(ppm)	0.12	0.08
Copper(ppm)	9.12	8.3
Chromium(ppm)	2.88	2.21

Results

1- The influence of addition of powdered root of Ashwaganda (*Withania somnifera*) on general health condition (growth performance) (body weight,

weight gain, feed intake and feed efficiency):

Data demonstrating the effect of 0.5, 1 and 1.5% *Withania somnifera* root powder at the 28 and 42 days on the body weight, weight gain,

feed intake and feed efficiency are summarized in Table (2) and Table (3) respectively. The body weight and the body weight gain significantly increased ($P<0.05$) in the groups that given *Withania somnifera* powdered root at 0.5 and 1%. While *Withania somnifera* powdered root at 1.5 % showed non-significant changes in comparison with control group.

The feed intake and the feed efficiency significantly decreased ($P<0.05$) in the groups that given *Withania somnifera* powdered root at 0.5 and 1%. While *Withania somnifera* powdered root at 1.5 % showed non-significant changes in comparison with control group..

Effect on hematological picture:

Data demonstrating the effect of *Withania somnifera* powdered root on hematological parameters (RBCs, Hb, PCV, MCV, MCH, and MCHC) at the 28 and 42 days are summarized in **Table (4) and Table (5) respectively.**

RBCs (Mill/ \square l), PCV% and Hb (gm/dl) significantly increased ($P<0.05$) in the groups that given *Withania somnifera* powdered root at 0.5 and 1%. While *Withania somnifera* powdered root at 1.5 % showed non-significant changes.

Regarding to MCV (fl), MCH (pg) and MCHC (%) there were non-significant changes in all groups given *Withania somnifera* powdered root 0.5, 1 and 1.5% in comparison with control group.

Leukocytes and differential leukocytic count

Total leukocytic count at the 28 and 42 days are summarized in Table (6) and Table (7) respectively, it showed significant increase ($P<0.05$) in groups supplemented with *Withania somnifera* powdered, root 0.5 and 1%, and insignificant change in group supplemented with 1.5% *Withania somnifera* powdered root in comparison with control group.

Lymphocytes:

Absolute numbers of lymphocytes significantly increased ($P<0.05$) in in groups treated with *Withania somnifera* powdered root (0.5 and 1%). There were insignificant changes in absolute numbers in group supplemented with 1.5% *Withania somnifera* powdered root in comparison with control group.

Heterophilis:

Insignificant changes in all groups supplemented with *Withania somnifera* powdered root in comparison with control group.

Monocytes:

Insignificant changes in all groups supplemented with *Withania somnifera* powdered root in comparison with control group.

Eosinophils:

Insignificant changes in all groups supplemented with *Withania somnifera* powdered root in comparison with control group.

Basophils:

Insignificant changes in all groups supplemented with *Withania somnifera* powdered root in comparison with control group.

Table (2): The effect of different dose levels of *Withania somnifera* (0.5%, 1% and 1.5%) after four weeks (28 days) on the body weight, body weight gain, Feed intake and feed conversion ratio in broilers. (Mean \pm SE)

Parameters Group	body weight (g)	Weight Gain (g)	Feed Intake (/g)	FCR (%)
Control Group	1416.2 \pm 20.16 ^c	980.2 \pm 17.27 ^b	881.4 \pm 12.34 ^a	0.9 \pm 0.01 ^a
Treated by <i>Withania somnifera</i> 0.5%	1485.2 \pm 14.15 ^a	1036.6 \pm 8.60 ^a	850.8 \pm 16.37 ^c	0.82 \pm 0.01 ^b
Treated by <i>Withania somnifera</i> 1%	1451 \pm 21.25 ^b	1027.2 \pm 8.29 ^a	860 \pm 17.11 ^b	0.84 \pm 0.009 ^b
Treated by <i>Withania somnifera</i> 1.5%	1421.8 \pm 33.61 ^c	983.8 \pm 11.55 ^b	880 \pm 17.76 ^a	0.89 \pm 0.02 ^a

* Significant at P < 0.05 using ANOVA test

a, b, c insignificant difference in similar letter within the same raw using Duncan Multiple Range Test.

Table (3): The effect of different dose levels of *Withania somnifera* (0.5%, 1% and 1.5%) after six weeks (42 days) on the body weight, body weight gain, Feed intake and feed conversion ratio in broilers. (Mean \pm SE)

Parameters Group	body weight(g)	Weight Gain(g)	Feed Intake(/g)	FCR(%)
Control Group	2752.8 \pm 31.84 ^c	1336.6 \pm 29.41 ^c	1328.2 \pm 10.26 ^a	0.99 \pm 0.03 ^a
Treated by <i>Withania somnifera</i> 0.5%	2910 \pm 36.82 ^a	1424.8 \pm 37.77 ^a	1333 \pm 12.12 ^a	0.93 \pm 0.13 ^a
Treated by <i>Withania somnifera</i> 1%	2841 \pm 30.62 ^b	1390 \pm 38.79 ^b	1330 \pm 12.07 ^a	0.95 \pm 0.06 ^a
Treated by <i>Withania somnifera</i> 1.5%	2744.2 \pm 33.78 ^c	1322.4 \pm 16.01 ^c	1328 \pm 10.61 ^a	1.00 \pm 0.01 ^a

a, b, c insignificant difference in similar letter within the same raw using Duncan Multiple Range Test.

Table (4): The effect of different dose levels of *Withania somnifera* (0.5%, 1% and 1.5%) after 4 weeks (28 days) on some erythrogram parameters in broilers. (Mean \pm SE)

Parameters Group	RBCs ($\times 10^6$ /ml)	Hb (gm/dl)	PCV (%)	MCV (fl)	MCH (pg)	MCHC (%)
Control Group	1.69 \pm 0.04 ^c	6.58 \pm 0.08 ^b	26.2 \pm 0.39 ^b	155.2 \pm 9.52 ^a	39.20 \pm 1.95 ^a	25.18 \pm 1.34 ^a
<i>Withania somnifera</i> 0.5%	2.14 \pm 0.05 ^a	7.68 \pm 0.10 ^a	29.8 \pm 0.81 ^a	149.2 \pm 11.07 ^a	38.80 \pm 1.52 ^a	25.02 \pm 1.33 ^a
<i>Withania somnifera</i> 1%	1.84 \pm 0.03 ^b	7.70 \pm 0.11 ^a	29.6 \pm 0.52 ^a	150.6 \pm 12.84 ^a	41.40 \pm 1.73 ^a	27.76 \pm 1.50 ^a
<i>Withania somnifera</i> 1.5%	1.79 \pm 0.06 ^c	6.46 \pm 0.14 ^b	26.8 \pm 0.56 ^b	151.8 \pm 12.32 ^a	36.40 \pm 2.55 ^a	26.10 \pm 2.34 ^a

* Significant at P < 0.05 using ANOVA test

a, b, c insignificant difference in similar letter within the same raw using Duncan Multiple Range Test.

Table (5): The effect of different dose levels of *Withania somnifera* (0.5%, 1% and 1.5%) after 6 weeks (42 days) on some erythrogram parameters in broilers. (Mean \pm SE)

Parameters Group	RBCs ($\times 10^6/ml$)	Hb(gm/dl)	PCV(%)	MCV (fl)	MCH(pg)	MCHC(%)
Control Group	1.70 \pm 0.03 ^b	7.02 \pm 0.18 ^b	25.1 \pm 0.30 ^b	155 \pm 5.89 ^a	44.2 \pm 1.38 ^a	27.56 \pm 1.75 ^a
<i>Withania somnifera</i> 0.5%	1.88 \pm 0.05 ^a	7.65 \pm 0.14 ^a	28.4 \pm 0.40 ^a	159.4 \pm 4.38 ^a	41.4 \pm 0.69 ^a	25.92 \pm 2.56 ^a
<i>Withania somnifera</i> 1%	1.78 \pm 0.04 ^a	7.65 \pm 0.14 ^a	28.7 \pm 0.46 ^a	158.4 \pm 5.26 ^a	44.6 \pm 1.51 ^a	27.64 \pm 2.60 ^a
<i>Withania somnifera</i> 1.5%	1.71 \pm 0.07 ^b	7.08 \pm 0.31 ^b	25.2 \pm 0.29 ^b	155 \pm 5.89 ^a	44.4 \pm 1.59 ^a	30.62 \pm 2.85 ^a

* Significant at P < 0.05 using ANOVA test

a, b, c insignificant difference in similar letter within the same raw using Duncan Multiple Range Test.

Table (6): Leukogram (mean \pm S.E) in broilers treated by *Withania somnifera* (0%, 0.5%, 1% and 1.5%) after 4 weeks (28 days).

	TLC $\times 10^3/\mu l$	Heterophil $\times 10^3/\mu l$	Lymphocyte $\times 10^3/\mu l$	Monocyte $\times 10^3/\mu l$	Eosinophil $\times 10^3/\mu l$	Basophil $\times 10^3/\mu l$
Control Group	35.40 \pm 0.027 ^b	9.50 \pm 0.050 ^a	23.29 \pm 0.023 ^b	1.63 \pm 0.061 ^a	0.99 \pm 0.050 ^a	0 \pm 0
<i>Withania somnifera</i> 0.5%	37.40 \pm 0.022 ^a	9.63 \pm 0.123 ^a	25.17 \pm 0.069 ^a	1.60 \pm 0.121 ^a	1.00 \pm 0.121 ^a	0 \pm 0
<i>Withania somnifera</i> 1%	37.60 \pm 0.039 ^a	9.61 \pm 0.045 ^a	25.34 \pm 0.066 ^a	1.65 \pm 0.065 ^a	0.98 \pm 0.044 ^a	0 \pm 0
<i>Withania somnifera</i> 1.5%	35.20 \pm 0.042 ^b	9.43 \pm 0.073 ^a	23.09 \pm 0.015 ^b	1.69 \pm 0.049 ^a	0.99 \pm 0.051 ^a	0 \pm 0

a, b insignificant difference in similar letter within the same raw using Duncan Multiple Range Test.

Table (7): Leukogram (mean \pm S.E) in broilers treated by *Withania somnifera* (0%, 0.5%, 1% and 1.5%) after 6 weeks (42 days).

	TLC $\times 10^3/\mu l$	Heterophil $\times 10^3/\mu l$	Lymphocyte $\times 10^3/\mu l$	Monocyte $\times 10^3/\mu l$	Eosinophil $\times 10^3/\mu l$	Basophil $\times 10^3/\mu l$
Control Group	35.80 \pm 0.011 ^b	9.53 \pm 0.084 ^a	23.55 \pm 0.019 ^b	1.72 \pm 0.095 ^a	0.93 \pm 0.061 ^a	0 \pm 0
<i>Withania somnifera</i> 0.5%	37.60 \pm 0.039 ^a	9.69 \pm 0.076 ^a	25.27 \pm 0.051 ^a	1.58 \pm 0.053 ^a	1.13 \pm 0.021 ^a	0 \pm 0
<i>Withania somnifera</i> 1%	37.80 \pm 0.017 ^a	9.75 \pm 0.086 ^a	25.33 \pm 0.049 ^a	1.66 \pm 0.066 ^a	1.06 \pm 0.053 ^a	0 \pm 0
<i>Withania somnifera</i> 1.5%	35.60 \pm 0.022 ^b	9.54 \pm 0.076 ^a	23.35 \pm 0.019 ^b	1.71 \pm 0.049 ^a	0.99 \pm 0.051 ^a	0 \pm 0

* Significant at P < 0.05 using ANOVA test

a, b insignificant difference in similar letter within the same raw using Duncan Multiple Range Test.

Discussion

In this research, body weight as well as the mean weight gain of the birds showed significant increase in the chicks supplemented with *Withania somnifera* root powder at 0.5 and 1%. Our finding are in

agreement with *Mishra and Singh (2000)*, *Samarth et al (2002)*, *Pedulwar et al (2007)*, *Ansari et al (2008)*, *Shisodiya et al (2008)*, *Choudhari et al (2008)*, *Jadhav et al (2008)*, *Muhammad et al (2011)* and *Rohatash et al (2012)* who,

reported that there were significant increase in the body weight in the broiler chicks supplemented with *Withania somnifera* in comparison with control group.

Regarding to the feed intake, there were a significant decrease in the group supplemented with *Withania somnifera* powdered root at 0.5 and 1%. Our finding are in agreement with (*Mishra and Singh, 2000*) who, reported that feed intake in supplemented group was slightly lower as compared to unsupplemented group. While our results revealed disagreement with (*Muhammad et al., 2011*) who, reported that supplementation of *Withania somnifera* aqueous extract in the drinking water of broiler chickens at 10, 20 and 30g/L, for 5 weeks, starting from the first day of age resulted in significant increase in feed intake of the birds at all the dose levels.

Regarding to the feed efficiency in the supplemented groups with *Withania somnifera* root powder at 0.5 and 1%, it was better than the control group. Our finding are in agreement with *Mishra and Singh (2000)*, *Pedulwar et al (2007)*, *Ansari et al (2008)*, *Shisodiya et al (2008)*, *Choudhari et al (2008)*, *Jadhav et al (2008)*, and *Rohatash et al(2012)* who, mentioned that dietary addition of Ashwagandha root powder raised body weight and improved feed efficiency.

The hematological examinations in this research showed a significant improvement in erythrogram

(RBCs, Hb, and PCV) with the two dose level 0.5 and 1% of *Withania somnifera* powdered root in comparison with control group.

These results agreed with *Ziauddin et al (1996)*, *Siddiqui et al (2007)*, *Daisy et al (2008)*, *Dhenge et al (2009)*, *Muhammad et al (2011)*, and *Rohatash et al (2012)*.

High values of RBCs, Hb, and PCV may be due to hematopoiesis effect of *Withania somnifera* (*Gautam et al., 2004*).

With respect to the total leukocytic count of *Withania somnifera* root powder treated chicken, there were significant increase in groups treated with *Withania somnifera* with the two dose level (0.5 and 1%) in comparison with control group. This increase in total leukocytes is due to increase in lymphocytes count. This rise in the TLC might be because of the ability of *Withania somnifera* to stimulate the bone marrow cells, it has been showed by *Davis and Kuttan (2000)*, who found that there was significant increasing in the TLC on the 10th day in mice injected (intraperitoneally) for 5 days with 70% methanol extract from root powder of Ashwagandha at the dose of 20 mg per animal, and this is an indicator of the hematopoiesis effect of Ashwagandha.

Our results are in agreement with, *Siddiqui et al (2007)*, *Daisy et al (2008)*, *Dhenge et al (2009)* and *Muhammad et al (2011)*.

Conclusion and Recommendation

From the present study, we can concluded that the use of *Withania somnifera* root powder at concentration of 0.5 and 1% in the ration of broilers has growth promoting effect which was obvious by increasing the live body weight and body weight gain and improving the feed conversion ratio. *Withania somnifera* root powder, moreover have many advantages by improving the blood parameters as enhancing erythropoiesis and increase the immune parameter as lymphocytes.

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الملخص العربي

لقد اهتمت الأبحاث العلمية في الآونة الأخيرة بمعالجة كثير من الأمراض في الإنسان والحيوان باستخدام النباتات والأعشاب الطبية تجنباً للأثار السلبية والسيدة التي قد تنتج عن استخدام العقاقير التي من أصل كيميائي .

وقد اجريت هذه الدراسة على بدارى التسمين لتقييم تأثير مسحوق جذور نبات الاشواجندا لمدة 6 اسابيع متتالية على معدلات الأداء (وزن الجسم – وزن الجسم المكتسب – كمية العلف المستهلكة – معامل التحويل الغذائي) و بعض تحاليل الدم .

استخدم في هذه التجربة مائة كتكوت تسمين (روس 308) عمر يوم واحد وقد قسمت هذه الكتاكيت الى اربع مجموعات وكل مجموعة تحتوى على خمسة وعشرون كتكوت. وقد قسمت هذه المجموعات كالتالى:

المجموعة الاولى تركت كمجموعة ضابطة .

المجموعة الثانية فقد اضيف مسحوق جذور نبات الاشواجندا الى العليقة بتركيز 0.5%.

المجموعة الثالثة فقد اضيف مسحوق جذور نبات الاشواجندا الى العليقة بتركيز 1%.

المجموعة الرابعة فقد اضيف مسحوق جذور نبات الاشواجندا الى العليقة بتركيز 1.5%.

وقد اسفرت هذه الدراسة عن النتائج التالية:

- لوحظ زيادة ذو دلالة احصائية فى وزن بدارى التسمين ووزن الجسم المكتسب نتيجة لتغذية البدارى بالعليقة المزودة بمسحوق جذور نبات الاشواجندا بتركيز (0.5 و 1 %).
- نقص ذو دلالة معنوية فى كمية العلف المستهلكة بعد الاسبوع الرابع والسادس بالمجموعات المتغذية على العليقة المزودة بمسحوق جذور نبات الاشواجندا بتركيز (0.5 و 1 %).
- تحسن ذو دلالة معنوية فى معامل التحويل الغذائى بعد الاسبوع الرابع والسادس بالمجموعات المتغذية على العليقة المزودة بمسحوق جذور نبات الاشواجندا بتركيز (0.5 و 1 %).
- زيادة ذو دلالة معنوية فى عدد كرات الدم الحمراء ,الهيموجلوبين ,نسبة الهيماتوكريت ,عدد كرات الدم البيضاء ,الليمفوسيت بعد الاسبوع الرابع والسادس بالمجموعات المتغذية على العليقة المزودة بمسحوق جذور نبات الاشواجندا بتركيز (0.5 و 1 %).

الخلاصة:

مسحوق جذور نبات الاشواجندا لها تأثير ايجابى على معدلات النمو فى البدارى متمثلة فى زيادة الوزن العام ووزن الجسم المكتسب.

استخدام هذا المحفز يحسن من بعض مكونات الدم وكذلك يزيد من مناعة الطائر وذلك بزيادة كرات الدم البيضاء المتمثلة فى الليمفوسيت لذلك ينصح باستخدام مسحوق جذور نبات الاشواجندا بالجرعات المقررة.