Haryana Vet. (December, 2020) **59(2)**, 201-205 **Research Article**

EFFECT OF DIETARY SUPPLEMENTATION OF ASHWAGANDHA ROOT POWDER ON PRODUCTION PERFORMANCE OF LAYING HENS

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ABSTRACT

An experiment was conducted to evaluate the effect of supplementation of different levels of Ashwagandha root powder (ARP) in the laying hens' diet on their production performance and egg quality parameters during a period of 16 weeks. A total of 120 white leghorn laying hens at 22 weeks of age were randomly selected and distributed into five experimental groups having four replicates of six birds each. The first group was kept as a control (T_1) and given the basal diet without antibiotics while second (T_2), third (T_3), fourth (T_4) and fifth (T_5) groups were fed basal diets supplemented with ARP @ 0.25, 0.5, 0.75 and 1%, respectively. Feed intake was significantly ($P<0.05$) improved by supplementation of 0.75% and 1% ARP in feed of layers. Egg mass and hen day egg production showed significant ($P<0.05$) increase as the level of ARP inclusion increased. Feed Conversion Ratio (FCR) was not significantly affected by supplementation of ARP in diets. Egg weight was not affected by the ARP supplementation. Thus, the dietary supplementation of Ashwagandha root powder leads to significant improvement in the production performance.

Keywords- Ashwagandha, Egg weight, Layer, Production performance

Antibiotic growth promoters have been widely used for their property to enhance the production performance in livestock and poultry feeds. It is widely believed that use of antibiotics as growth promoters promotes evolution and/or selection of antibiotic-resistant strains in poultry farms. In the year 2006, the EU officially banned the usage of antimicrobials as growth promoters. In year 2019, India also has prohibited sale and distribution of the drug Colistin and its formulations for food producing animals, poultry, aqua farming and animal feed supplements (Gupta and Kumar, 2020). Now the poultry sector is continuously searching for new feed additives to improve the feed efficiency with minimum deleterious effects on animal health.

Herbal plants are a new class of growth promoters and in recent years these feed additives have gained extensive attention in the feed industry. Realizing this, a number of herbs have been identified for their use as feed additive including Ashwagandha, which in turn may improve the performance of birds.

Withania somnifera, commonly known as Ashwagandha, Indian ginseng, poison gooseberry, or winter cherry is a plant in the solanaceae or nightshade family. Ashwagandha root is bitter to taste and contains several alkaloids (0.13 to 4.30%), which offer medicinal usages.

It contains many active principles such as withanolides, withanone, somnitalglucose, rutinosides, inorganic salt and di-hydroxy kaempferol-3 (Pal *et al.*, 2012). These active principles have been reported to possess immunomodulatory, general tonic, hepato-protective, anti-stress, growth promoter and antioxidant properties (Ansari *et al.*, 2008; Singh *et al.*, 2010; Kushwaha *et al.*, 2012 and Varma *et al.*, 2012) beside antibacterial and anti-fungal properties (Punetha *et al.*, 2010).

MATERIALS AND METHODS

The study was carried out at poultry farm, Department of Animal Genetics & Breeding, College of Veterinary Sciences, Lala Lajpat Rai University of Veterinary and Animal Sciences, Hisar.

A total of one hundred and twenty (120) single comb hens of Synthetic White Leghorn strain of 22 weeks of age, in first phase of their production were randomly divided into five treatment groups i.e. T_1 (control), T_2 (0.25% ARP), T_3 (0.50% ARP), T_4(0.75% ARP), T_5(1% ARP) having four replications with six birds in each replication. Hens were fed the experimental diet for sixteen weeks of experimental period beginning at 22 weeks of age and continued up to 38 weeks of age. The basal diet of laying hens was formulated as per BIS (2007) standards. The ingredient composition and chemical composition of the layers' control ration (T_1), has been given in Table 1. For each replicate, group wise feed consumption per bird was taken at interval of each 2 weeks for 8 experimental periods where egg production was recorded daily. Four eggs were randomly selected from each replicate at the interval of each 2 week for measurement of egg weight and egg mass production. Feed conversion ratio as a measure of feed efficiency was calculated in terms of feed required to produce a dozen of

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Table 1

Ingredient and chemical composition of ration for layers of control group

Feed ingredients	Percentage
Maize	56.0
Groundnut cake	11.0
Soybean Meal	15.0
Wheat bran	5.0
Fish Meal	6.0
Mineral Mixture	3.0
Salt	0.5
Shell Grit	3.5
Chemical composition	**%DM basis**
CP	18.86
CF	3.86
EE	3.84
NFE	62.52
Ash	10.92
Metabolizable energy(Kcal/Kg)	2699.10

Feed additive included Intermix regular-10g, Intermix-BE-10g per 100 Kg of ration.

eggs and one kg egg mass by each group for the 8 period of 2 week each.

The data were statistically analysed according to the procedure laid down by Snedecor and Chochran (1994). The statistical analysis of data was performed using SPSS 20.0 version of Microsoft (SPSS, 2001). One-way ANOVA was used for the differences between groups. The mean differences among different treatments were separated by Duncan's multiple range tests. Consequently, a significance level of 5% ($P<0.05$) was used as the criterion for statistical significance (Duncan, 1955).

RESULTS AND DISCUSSION

Feed intake: The results of study revealed that the feed intake was significantly ($P<0.05$) improved by supplementation of 0.75% and 1% ARP in feed of layers (Table 2). It was also noticed that as the inclusion level of ARP powder increased in the diet of layers, the feed intake was significantly ($P<0.05$) improved as compared to control group. Several researchers have reported that there was ($P<0.05$) significant increase in feed intake in different Ashwagandha fed groups (Ansari *et al*., 2008 and Singh *et al*., 2010). Vasanthakumar *et al.* (2015) reported that the feed intake (g) was significantly ($P<0.05$) more with 1% Ashwagandha root powder and 0.15% root extract supplemented groups as compared to the control group. However, Bhardwaj and Gangwar (2011) found that cumulative feed intake (g/d) for 8-23 weeks feeding period was significantly ($P<0.05$) higher in control and lower in the entire Ashwagandha treated groups in Japanese quail hens.

Percent hen day egg production: The results of the study unveiled that there was significant ($P<0.05$) positive effect on percent hen day egg production by the supplementation of different levels (0.5, 0.75 and 1%) of ARP in the diet of layers (Table 3). The study revealed that as the inclusion level of ARP increased in the diets of layers, the percent hen day egg production was increased as compared to control (T_1) group. The present findings are in consonance with the results reported by Ibrahim *et al.* (2016) and Tahmasbi *et al.* (2012), who observed that supplementation of *Withania somnifera* in layers diet increased egg production than diet without supplementation. Bhardwaj and Gangwar (2011) also observed significantly ($P<0.05$) higher egg production in groups supplemented with Ashwagandha as compared to control group. The improvement in hen day egg production might be due to improved nutrient metabolizability and average feed intake. The improved nutrient metabolizability and feed intake were also reported in the present study.

Egg mass production: The egg mass production was significantly ($P<0.05$) increased in laying hens fed diets supplemented with different levels (0.75 and 1%) of ARP as compared to laying hens fed control diet. Egg mass production values in treatment groups T_4 and T_5 were significantly ($P<0.05$) higher from T_1, T_2 and T_3 treatment groups but did not show significant difference among themselves (Table 3). The results are in close agreement with Bhardwaj and Gangwar (2011) who found a positive effect of ARP on egg mass production. Similarly, Ibrahim *et al.* (2016) showed that supplemented hens with 1g/kg diet *Withania somnifera* root powder gave higher values ($P<0.05$) of egg mass compared to other treatments.The improvement in egg mass production might be due to improved nutrient metabolizability and average feed intake. The improved nutrient metabolizability and feed intake was also reported in the present study.

Feed Conversion Ratio (FCR): The results of the study unveiled that feed intake per dozen egg production and per kg egg mass production were not significantly affected by the supplementation of different levels of ARP in diet of layers (Table 2), indicating that the dietary supplementation of ARP at different levels had no effect on the feed intake per dozen egg production and per kg egg mass production. These results are similar to the findings of Tahmasbi *et al.*

Table 2

Feed intake (g/hen/day) and FCR under different dietary treatments in laying hens

Parameters (Weeks)	Treatments				
	T_1	T_2	T_3	T_4	T_5
Feed Intake					
22 – 24	104.36^{a}±0.71	106.91^{ab}±1.60	108.57^{bc}±1.57	111.69^{c}±0.73	110.95^{bc}±1.61
24 – 26	110.47^{a}±1.39	118.80^{b}±1.96	122.10^{b}±0.65	119.69^{b}±1.58	118.04^{b}±0.91
26 – 28	110.60^{a}±2.30	115.46^{b}±0.71	116.82^{b}±2.07	119.93^{b}±1.02	116.71^{b}±1.01
28 – 30	114.50^{b}±1.56	110.71^{a}±1.25	118.85^{c}±0.81	118.76^{c}±1.44	120.85^{c}±0.66
30 – 32	122.20^{ab}±1.72	116.61^{a}±1.18	122.76^{b}±2.64	123.97^{b}±1.26	122.36^{ab}±1.96
32 – 34	124.80±0.59	123.16±1.03	124.92±1.74	126.64±1.29	125.73±2.03
34 – 36	123.10±1.18	122.77±1.64	121.95±4.81	123.61±1.33	124.84±0.34
36 – 38	111.93±1.20	115.25±1.18	112.04±1.72	112.63±1.54	116.30±1.78
Mean	115.24^{a}±1.31	116.21^{ab}±1.03	118.50^{bc}±1.20	119.62^{c}±0.98	119.47^{c}±0.94
FCR (kg feed consumed per dozen of egg production)					
22 – 24	1.81±0.02	1.84±0.04	1.85±0.05	1.87±0.02	1.87±0.02
24 – 26	1.87±0.03	1.98±0.05	2.09±0.11	1.95±0.02	1.96±0.02
26 – 28	1.84±0.04	1.90±0.03	1.93±0.06	1.93±0.01	1.88±0.04
28 – 30	1.86±0.04	1.78±0.03	1.86±0.03	1.84±0.03	1.90±0.01
30 – 32	1.99±0.03	1.87±0.02	1.91±0.05	1.91±0.04	1.91±0.04
32 – 34	2.00^{b}±0.03	1.89^{a}±0.03	1.87^{a}±0.03	1.86^{a}±0.02	1.90^{a}±0.03
34 – 36	2.12±0.02	2.05±0.03	2.01±0.09	1.97±0.03	2.02±0.03
36 – 38	1.99^{ab}±0.01	2.06^{b}±0.03	1.96^{a}±0.01	1.96^{a}±0.01	2.05^{b} ±0.04
Mean	1.94±0.02	1.92±0.02	1.94±0.02	1.91±0.01	1.94±0.01
FCR (kg feed consumed per egg mass production)					
22 – 24	3.10±0.05	3.13±0.08	3.37±0.12	3.27±0.07	3.12±0.09
24 – 26	3.13±0.02	3.24±0.08	3.47±0.14	3.23±0.03	3.17±0.04
26 – 28	3.16±0.07	3.28±0.04	3.31±0.11	3.31±0.06	3.17±0.08
28 – 30	3.15±0.09	3.03±0.08	3.19±0.04	3.11±0.04	3.21±0.04
30 – 32	3.31±0.06	3.13±0.07	3.18±0.08	3.14±0.05	3.18±0.06
32 – 34	3.35^{b}±0.04	3.12^{a}±0.04	3.16^{a}±0.06	3.11^{a}±0.04	3.19^{a}±0.05
34 – 36	3.51±0.03	3.46±0.06	3.35±0.14	3.23±0.07	3.37±0.05
36 – 38	3.31^{abc}±0.04	3.48^{c}±0.10	3.26^{ab}±0.02	3.22^{a}±0.04	3.42^{bc}±0.05
Mean	3.25±0.03	3.23±0.04	3.29±0.04	3.20±0.02	3.23±0.03

The mean values in same row with different superscripts differ significantly ($p<0.05$). FCR=Feed conversion ratio

(2012) who reported that FCR was not significantly different among birds fed on different concentrations of *Withania somnifera* in diet of quails. Similarly, non-significant difference in FCR was recorded by Shisodiya *et al*. (2008) and Thange *et al*. (2009). Findings of these experiments were contrary to the observation of Ibrahim *et al.* (2016) who showed that, ARP 1g/kg diet resulted in a significant ($P<0.05$) improvement in FCR in Japanese quails. Bhardwaj and Gangwar (2011) also observed that FCR (feed intake/egg mass) and net FCR were significantly ($P<0.05$) better in Ashwagandha supplemented groups than control group in laying quail hens.

Egg weight: The mean egg weights did not differ significantly during entire experimental period under different treatment groups (Table 3). Cumulative mean of egg weight of different dietary ARP treatment groups did not differ significantly when compared to control diet. Present findings are in agreement with Ibrahim *et al.* (2016) who observed that in egg weight, there is no significant difference in Ashwagandha supplemented groups as compared to control group in Japanese quails. While, opposite to these finding, Bhardwaj and Gangwar (2011) reported that egg weight was significantly ($P<0.05$) higher in diet containing 1 percent Ashwagandha than control group in laying quails. Tahmasbi *et al.* (2012) found that hens fed on a diet supplemented with the highest *Withania somnifera* had significantly ($P<0.05$) lower egg weight than those fed on the diet without *Withania*

Table 3

Egg production and egg weight under different dietary treatments in laying hens

Parameters(Weeks)	Treatments				
	T_1	T_2	T_3	T_4	T_5
Hen-day egg production (%)					
22 – 24	69.15±0.79	69.81±0.93	70.62±0.94	71.87±0.81	71.32±1.08
24 – 26	70.82±0.86	72.03±1.32	70.50±3.47	73.74±0.75	72.47±1.04
26 – 28	72.03±1.14	72.85±1.33	72.73±1.29	74.55±0.80	74.45±1.09
28 – 30	73.86^{a}±0.69	74.48^{a}±1.05	76.62^{ab}±1.08	77.61^{b}±0.93	76.45^{ab}±0.93
30 – 32	73.59±1.22	74.86±1.32	77.03±1.08	78.03±1.26	77.01±1.29
32 – 34	74.76^{a}±0.88	78.05^{b}±1.15	80.01^{bc}±1.34	81.76^{c}±0.76	79.55^{bc}±0.90
34 – 36	69.80^{a}±0.79	71.84^{ab}±0.92	72.93^{bc}±0.85	75.49^{c}±1.14	74.15^{bc}±1.09
36 – 38	67.40±1.02	67.05±0.63	68.72±1.37	68.83±0.79	68.11±1.11
Mean	71.43^{a}±0.52	72.62^{ab}±0.66	73.64^{bc}±0.83	75.23^{c}±0.73	74.19^{bc}±0.69
Egg mass production (g/day/hen)					
22 – 24	33.70±0.56	34.13±0.40	32.31±0.79	34.16±0.64	35.68±1.39
24 – 26	35.34±0.41	36.68±0.53	35.39±1.41	37.08±0.56	37.21±0.55
26 – 28	34.98±0.44	35.19±0.54	35.33±0.71	36.30±0.51	36.85±0.65
28 – 30	36.38±0.62	36.58±0.70	37.22±0.21	38.26±0.51	37.64±0.50
30 – 32	36.94^{a}±0.47	37.33^{a}±0.81	38.66^{ab}±0.55	39.52^{b}±0.37	38.54^{ab}±0.52
32 – 34	37.27^{a}±0.34	39.52^{b}±0.75	39.59^{b}±1.12	40.73^{b}±0.49	39.36^{b}±0.32
34 – 36	35.06^{a}±0.32	35.55^{a}±0.87	36.44^{ab}±0.38	38.35^{b}±0.78	37.06^{ab}±0.59
36 – 38	33.86±0.67	33.18±0.73	34.33±0.65	34.96±0.54	34.04±0.59
Mean	35.44^{a}±0.27	36.02^{ab}±0.39	36.16^{ab}±0.47	37.42^{c}±0.41	37.05^{bc}±0.35
Egg weight (g)					
22 – 24	48.73±0.33	48.92±0.78	45.77±1.20	47.53±0.71	49.98±1.38
24 – 26	49.92±0.70	50.95±0.72	50.30±0.94	50.29±0.63	51.36±0.40
26 – 28	48.57±0.17	48.32±0.34	48.57±0.19	48.70±0.65	49.49±0.21
28 – 30	49.24±0.59	49.11±0.56	48.61±0.82	49.30±0.13	49.24±0.32
30 – 32	50.21±0.49	49.88±1.01	50.19±0.45	50.67±0.41	50.07±0.74
32 – 34	49.88±0.61	50.66±1.15	49.46±0.70	49.81±0.17	49.49±0.30
34 – 36	50.25±0.21	49.47±0.69	49.97±0.49	50.79±0.59	49.98±0.40
36 – 38	50.23±0.23	49.45±0.67	49.94±0.47	50.81±0.57	49.96±0.39
Mean	49.63±0.18	49.60±0.28	49.11±0.34	49.74±0.26	49.95±0.22

The mean values in same row with different superscripts differ significantly ($P< 0.05$)

somnifera during late phase of production.

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