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EFFICACY OF HERBAL SUPPLEMENTATION IN AUGMENTING THE PERFORMANCE OF LAYER BIRDS

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ABSTRACT

A total of 72 layer birds were selected and the trial was carried out between 25th to 48th week of age. The layer birds were allotted into three groups, having 24 numbers in each group. Group T0 (n=24) was kept as control and fed standard basal diet. Group T1 (n=24) was supplemented with Dimbpro (M/S Ayurvet Limited) at the rate of 500g per ton of feed as week a month programme along with the standard basal diet. Group T2 (n=24) was supplemented with Brand A at the rate of 500g per ton of feed as week a month programme along with the standard basal diet. Parameters viz. weekly body weight, weekly feed consumption, hen day egg production, egg weight, egg quality traits and serum biochemistry were evaluated. Results revealed that there was significant decrease in the feed consumption of birds in the Dimbpro supplemented group as compared to the control group. The hen day egg production and egg weight were significantly increased in the Dimbpro supplemented group as compared to the control group. The feed per unit of egg production was significantly less in the Dimbpro supplemented group as compared to the control group.

INTRODUCTION

Poultry farming in India, despite its own set of constraints, has progressed by leaps and bounds during the last decade (Vetrivel and Chandrakumarmangalam, 2013). From being largely a backyard venture before the 1960s, the Indian poultry sector has evolved into a vibrant agribusiness spurred by domestic economic growth and consumption dynamics (Hellin et al., 2015). Significant breakthrough in poultry science and technology has dramatically helped in breeding of genetically superior birds capable of high production (Ali, 2015). Eggs constitute one of the most affordable sources of animal protein available, and so it is not surprising that the number of laying flocks is rapidly increasing in developing countries like India and China (Bain, 2016). The quality of table eggs is dependent of diverse influences before and after oviposition (Mazzuco and Bertechini 2014). Egg formation is a dynamic biological process that takes 24 to 36 hours, out of which 20 are required to form the eggshell after the egg reaches the eggshell gland (Swenson & Reece, 1996). Feeding management for layer pullets aims to maintain a growth rate that will lead to the pullet reaching sexual maturity at the desired age while avoiding obesity. Laying birds have high calcium requirements for bone maintenance and eggshell deposition, which are supplied by adequate and available calcium dietary sources (Pizzolante et al., 2009). In laying hens, antioxidants are equally of significant interest because their offspring also needs oxidative protection best already in the egg (Loetscher et al., 2014). In view of the need to meet the various requirements of layer birds and enhance productivity, the present study has been undertaken to evaluate the efficacy of polyherbal in increasing egg production and sustaining peak egg lay.

MATERIALS AND METHODS

Experimental Design

A total of 72 layer birds were selected and the trial was carried out between 25th to 48th week of age at the department of Poultry Science, NTR College of Veterinary Science, Gannavaram.

The layer birds were allotted into three groups, having 24 numbers in each group. Group T0 (n=24) was kept as control and fed standard basal diet. Group T1 (n=24) was supplemented with dimbpro at the rate of 500g per ton of feed as week a month programme along with the standard basal diet. Group T2 (n=24) was supplemented with Brand A at the rate of 500g per ton of feed as week a month programme along with the standard basal diet. Parameters viz. weekly body weight, weekly feed consumption, hen day egg production, egg weight, egg quality traits and serum biochemistry were evaluated.

Statistical analysis

The data collected was analyzed by applying standard statistical methods described by Snedecor and Cochran (1971).

RESULTS AND DISCUSSION

Weekly body weight

Results revealed that the weekly body weight was constant between the control and the treated groups throughout the period of study.

Table 1 Weekly body weight

Age (Wks)	Body weight (g)		
	Group T0	Group T1	Group T2
25-28	1020	1120	1010
29-32	1020	1180	1090
33-36	1100	1215	1180
37-40	1150	1250	1200
41-44	1150	1275	1210
45-48	1200	1315	1310
SEM	0.119	0.04	0.021

Weekly feed consumption

The weekly feed consumption was recorded to be significantly lower in the Dimbpro treated group T1 as compared to the control group T0 (table 2). The feed consumption between 45th week to 48th week was significantly less in the Dimbpro treated group T1 (18144g) as compared to the control group T0 (18312g).

Table 2 Weekly feed consumption

Age (Wks)	Weekly feed consumption (g)		
	Group T0	Group T1	Group T2
25-28	18312	18144	18816
29-32	18480	18480	19488
33-36	18984	18816	19824
37-40	19320	19320	20160
41-44	20328	19824	21504

45-48	18312	18144	18816
SEM	1.28	0.989	1.34

Hen day egg production

The hen day egg production was significantly higher in the Dimbpro treated group T1 as compared to the control group T0 (table 3). Between the 37th to 40th week, there was significant increase in the hen day egg production in the Dimbpro treated group T1 (82.7) as compared to control group T0 (76.4).

Table 3 Hen day egg production

Age (Wks)	Hen day egg production		
	Group T0	Group T1	Group T2
25-28	82.4	85.2	82.3
29-32	83.2	88.3	84.4
33-36	77	85.4	73.3
37-40	76.4	82.7	75.1
SEM	0.500	0.205	0.303

Feed per unit of egg production

The feed per unit of egg production was significantly less in the Dimbpro treated group T1 as compared to Brand A treated group T2 and control group T0. Between the 37th week and 40th week, the feed per unit of egg production (g) was recorded to be 137.2 g in the Dimbpro treated group T1, whereas 149.8 g in the control group T0 and 148.7 g in the Brand A treated group T2.

Table 4 Feed per unit of egg production

Age (Wks)	Feed per unit of egg production (g)		
	Group T0	Group T1	Group T2
25-28	128.5	125.1	125.5
29-32	130.8	124.7	127.2
33-36	144.6	129.7	146.2
37-40	149.8	137.2	148.7
SEM	0.002	0.002	0.021

Egg weight

The egg weight was found to be higher in the Dimbpro treated group T1 as compared to control group T0 (table 5).. Between week 41st to 8th week, the egg weight was recorded to be 62.59g in the Dimbpro treated group T1 whereas it was recorded to be 58.69g in the control group T0.

Table 5 Egg weight (g)

Age (Wks)	Group T0	Group T1	Group T2
25-28	56.32	58.62	57.63
29-32	58.68	60.84	60.23
33-36	60.21	60.85	60.45
37-40	60.35	61.97	60.68
41-44	58.69	62.59	61.32
45-48	58.89	62.64	61.35
SEM	0.25	0.28	0.32

Shape index

There was no significant difference in the Shape index between the treated groups and the control group.

Table 6 Shape index

Age (Wks)	Shape index		
	Group T0	Group T1	Group T2
25-28	75.23	80.06	77.63
29-32	77.02	79.62	79.37
33-36	79.35	80.21	77.82
37-40	74.99	78.7	74.32
41-44	76.13	79.25	77.54
45-48	76.65	79.36	77.36
SEM	0.51	0.32	0.32

Albumin index

The albumin index was son-significantly variable between the control group and the treated groups (table 7).

Table 7 Albumin index (%)

Age (Wks)	Albumin index (%)		
	Group T0	Group T1	Group T2
25-28	0.54	0.66	0.63
29-32	0.62	0.64	0.57
33-36	0.9	1.003	1.05
37-40	0.54	0.66	0.73
41-44	0.62	0.64	0.57
45-48	0.63	0.64	0.56
SEM	0.15	0.13	0.15

Yolk index

There was no significant difference in the yolk index between the control group and the treated groups (table 8).

Table 8 Yolk index (%)

Age (Wks)	Yolk index (%)		
	Group T0	Group T1	Group T2
25-28	0.32	0.46	0.43
29-32	0.41	0.47	0.44
33-36	0.42	0.51	0.47
37-40	0.42	0.52	0.48
41-44	0.4	0.48	0.46
45-48	0.39	0.48	0.45
SEM	0.036	0.156	0.032

Yolk weight

Results revealed no significant difference in yolk weight between the control group, Dimbpro treated group and Brand A treated group.

Table 9 Yolk weight (g)

Age (Wks)	Yolk weight (%)		
	Group T0	Group T1	Group T2
25-28	14.15	15.54	15.32
29-32	14.26	15.24	15.46
33-36	14.25	16.17	15.58
37-40	14.32	16.38	16.09
41-44	16.25	16.42	16.02
45-48	13.56	16.53	16.28
SEM	0.06	0.04	0.02

Albumin weight

There was no significant difference recorded in the albumin weight between the control group, Dimbpro treated group and Brand A treated group.

Table 10 Albumin weight (g)

Age (Wks)	Albumin weight (g)		
	Group T0	Group T1	Group T2
25-28	34.05	35.62	35.56
29-32	32.56	35.76	35.56
33-36	36.52	41.43	41.21
37-40	40.34	41.44	41.2
41-44	40.68	41.51	41.51
45-48	40.62	41.26	41.16
SEM	0.151	0.091	0.089

Yolk:albumin

The yolk:albumin ratio was found to be significantly higher in the Dimbpro treated group T1 as compared to the control group T0.

Table 11 Yolk: albumin

Age (Wks)	Yolk: albumin		
	Group T0	Group T1	Group T2
25-28	0.42	0.44	0.43
29-32	0.44	0.43	0.43

33-36	0.39	0.39	0.38
37-40	0.35	0.40	0.39
41-44	0.40	0.40	0.39
45-48	0.33	0.40	0.40
SEM	0.002	0.001	0.001

Shell weight

The shell weight in the control group and the treated groups did not show any significant difference among themselves

Table 12 Shell weight

Age (Wks)	Shell weight		
	Group T0	Group T1	Group T2
25-28	9.016	9.661	9.571
29-32	10.68	9.591	10.08
33-36	10.12	9.568	9.997
37-40	9.882	9.491	9.691
41-44	10.11	9.444	9.604
45-48	10.82	10.35	9.687
SEM	0.069	0.058	0.092

Shell thickness

The shell thickness was found to be non significantly variable between the control group T0, Dimbpro treated group T1 and the Brand A treated group T2.

Table 13 Shell thickness

Age (Wks)	Shell thickness		
	Group T0	Group T1	Group T2
25-28	0.332	0.354	0.351
29-32	0.353	0.355	0.351
33-36	0.352	0.364	0.35
37-40	0.344	0.347	0.35
41-44	0.346	0.355	0.316
45-48	0.353	0.356	0.352
SEM	0.528	0.502	0.527

Serum biochemical parameters

The serum biochemical parameters were non significantly variable between the control group T0, Dimbpro treated group T1 and Brand A treated group T2.

Table 14 Serum biochemical variables

Treatment	Total protein (g/dl)	Albumin (g/dl)	Globulin (g/dl)	Albumin:globulin	AST	Ca (mg/dl)	Phosphorus (mg/dl)	Glucose	Cholesterol (mg/dl)
Group T0	7.10	2.23	3.56	0.61	17.71	10.92	5.63	182.10	49.20
Group T1	5.8	1.79	4.46	0.4	46.31	9.01	7.43	170.68	58.63
Group T2	4.55	2.13	3.82	0.56	58.35	10.26	5.35	158.35	59.27
SEM	0.116	0.045	0.112	0.015	0.103	0.266	0.423	0.423	7.85

Discussion

The study revealed that weight gain of birds was constant in both the control and the treated groups throughout the period of study. The feed consumption of birds was also reduced in the Dimbpro supplemented group as compared to control. The decrease in feed consumption may be due to the presence of herb *Piper nignum* which is known to increase digestibility and feed absorption from the intestine and aid in better utilization of feed (Han 2011, Minton 2008). A substantial body of research has also shown that *Piper nigrum* helps in absorption of calcium (Lixandru, 2014). Calcium is required for several metabolic functions in poultry (Nunes *et al*., 2006) and to ensure good eggshell quality Piper *nigrum,* being a constituent ingredient of Dimbpro premix, may have contributed to bigger egg size consequent upon better calcium absorption. Studies have also indicated that *Zingiber officinale* is effective in enhancing laying performance in poultry (Zhao *et al*., 2011; Akbarian *et al.*, 2011). The improved hen day egg production and egg weight in the present study may be attributed to *Zingiber officinales*, a constituent ingredient of Dimbpro premix. *Cissus quadrangularis,* another constituent ingredient present in Dimbpro, is known to possess high concentration of calcium (Mishra *et al*., 2010).This may me another reason for better egg quality obtained in the Dimbpro treated group.

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