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EFFICACY OF SUPPLEMENTATION OF HERBAL METHIONINE ON THE PERFORMANCE OF COMMERCIAL LAYERS

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ABSTRACT

40 one day old commercial layer chicks of BV 300 strain were randomly divided into two treatment groups with two replicates of 10 chicks each and reared under deep litter system of housing. Group T_1 was positive control fed with the basal diet without any natural or synthetic source of methionine. Group T_2 was test group fed with the basal diet supplemented with herbal methionine, Methiorep @ 500g/ton of feed for a period of 0 to 38 weeks (supplied by M/S Ayurvet Ltd., Baddi, India). Methiorep supplemented birds showed higher body weight throughout the experimental period as compared to unsupplemented control group. Hen housed egg production (HHEP) was also found to be higher in Methiorep supplemented birds (76.06) as compared to control group (70.80). Feed efficiency per dozen eggs produced was also found to be better in Methiorepsupplemented group (1.49) birds as compared to control group birds (1.65). From the results of the study it can be concluded that supplementation of Methiorep elicited growth performance and egg production performance in commercial layers.

KEYWORDS: mean egg production, Growth, Layers.

INTRODUCTION

The main source of protein in poultry rations are either animal proteins or plant proteins. At present, the requirement of protein sources in India is 4.72 million MT and it will increase to 19.83 million MT by 2015 (Chadda, 1998). The levels and balance of amino acids in the diets are important nutritional variables that affect the economic efficiency of an egg laying enterprise (Al-Saffar and Rose 2002). Severe or chronic deficiencies of certain nutrients impair immune response and increases susceptibility to infectious diseases affecting growth and performance. Methionine is one of the essential amino acids for poultry. Methionine deficiency leads to weight loss, significant increase in hepatic damage enzymes (Marcolin et al., 2011) and has a carcinogenetic effect (Sawada et al., 1990). So methionine should be provided in a right quantity in to the feed ration. But more synthetic methionine in the diet is metabolized into highly toxic compounds like methyl propionate, thereby, adversely altering the performance of birds (Bender, 1985). Organic farming concept is new and generally practised to avoid adverse effects related to the use of synthetic drugs in poultry. Herbal preparations composed of single or multiple plant ingredients are used in poultry for various indications (Waghmare et al., 2006; Ramnath et al. 2008). Herbal methionine as a source of active methionine is claimed to be effective on performance and cost benefit ratio (Halder and Roy, 2007). The aim of the study is to evaluate efficacy of herbal methionine supplement formulation Methiorep (*M/S Ayurvet Limited, Baddi, India*) in improving overall growth, productivity and performance in poultry birds.

MATERIALS AND METHODS

The present study was undertaken during June, 2014 to March, 2015 at Poultry Research Center, Department of Poultry Science, Post Graduate Institute of Veterinary and Animal Sciences, Akola. 40 one day old commercial layer chicks of BV 300 strain were randomly divided into two treatment groups with two replicates of 10 chicks each and reared under deep litter system of housing. Group-I was positive control fed with the basal diet without any natural or synthetic source of methionine. Group- II was test group fed with the basal diet supplemented with Methiorep (*M/S Ayurvet Limited, India*) @ 500g/ton of feed for a period of 0 to 38 weeks. The average maximum and minimum temperature during the experimental period was recorded to be 27.96 to 37.33°C and 9.63 - 26.52°C, respectively and average relative humidity was recorded to be 42.97 - 77.82%.

Table 1: Nutrient composition (%) of experimental diet.

Sr. No.	Nutrients	Chick starter	Grower	Layer
1	Crude protein	20.00	16.00	18.00
2	ME Kcal/kg	2800	2500	2600
3	Crude fiber	7.00	9.00	9.00
4	Calcium	1.00	1.00	3.00
5	Total Phosphorus	0.70	0.65	0.65
6	Lysine	1.00	0.70	0.70
7	Methionine	0.40	0.35	0.35
8	Salt	0.50	0.50	0.50

Table 2: Ingredient composition (%) of experimental diet.

Sr. No.	Ingredients	Chick mash (0-8 weeks)	Grower mash (9-19 weeks)	Layer mash (20-35 weeks)
1.	Maize	57.00	48.00	54.00
2.	Soybean meal	30.00	18.00	26.00
3.	De-oiled rice bran	11.00	30.00	10.00
4.	Dicalcium phosphate	1.90	1.60	1.70
5.	Lime Stone	1.30	2.00	7.50
6.	DL- Methionine	0.10	0.10	.010
7.	L- Lysine	0.20	0.00	0.00
8.	Common Salt	0.44	0.30	0.40
9.	Vitamin Premix	0.10	0.10	0.10
10.	Trace Mineral	0.15	0.10	0.10

Parameters studied

The growth performance parameters (live body weight, and feed conversion ratio) were recorded at weekly intervals from 0 to 19 week of experimental period. Blood samples were drawn from the wing vein and serum samples were separated from the blood. These samples were used for the estimation of total protein, albumin, phosphorus, calcium, SGOT and SGPT on 8^{th} and 18^{th} week. In layer trial of 20 to 38 weeks egg production, feed efficiency per dozen egg produced and egg biomass was recorded. Egg quality traits were recorded at 25^{th}, 30^{th} and 35^{th} week.

Statistical Analysis

Observations were summarized in tabular form for each individual group. The data were analyzed following standard procedure (Snedecor and Cochran, 1994).

RESULTS AND DISCUSSION

Growth and Performance Parameters

The body weight in Methiorep supplemented group was found to be high as compared to control group from 0 to 19 week of experimental period. At 19^{th} week the average live body weight in Methiorep supplemented group was 1204.50 g as compared to 1189.25g in control group. Narayanswamy and Bhagwat (2010) also reported that the chicks in herbal methionine group showed a significant (p<0.01) gain in body weight as compared to the chicks in control group.

Table 3: Effect of supplementation of Methiorep on weekly body weight (g/b) of layer chicks.

Age (weeks)	Weekly body weight (g/b)		
	Control group	Methiorep supplemented group	SEM
0	31.95	32.00	0.286
1	62.55	63.70	0.405
2	92.20	94.20	0.422
3	131.25	145.30	2.137
4	177.80	188.00	3.516
5	248.05	266.00	4.639
6	347.60	359.20	5.668
7	423.50	439.45	7.423
8	510.60	531.45	6.989
9	613.10	629.85	7.134
10	694.90	716.30	7.482
11	752.65	778.80	7.871
12	813.50	847.95	7.808
13	874.40	903.45	8.744
14	936.45	951.04	16.616
15	1008.60	1021.60	16.243
16	1063.75	1076.80	9.823
17	1108.25	1123.60	8.388
18	1147.45	1161.90	8.539
19	1189.25	1204.50	6.368

Biochemical Parameters

Mean values of different biochemical parameters of both control group and Methiorep supplemented group are presented table 4. The results indicate that at both 8^{th} and

18th week of age albumin, calcium, phosphorus, SGOT and SGPT did not vary significantly between control and Methiorep supplemented group. Serum protein actually depends on availability of dietary protein. Total protein concentration at 8th and 18th week of age was significantly high (P<0.05) in Methiorep supplemented group (4.78 and 4.50, respectively) as compared to control group (3.50 and 3.04, respectively) (Table 4). High serum total protein in Methiorep supplemented group may be attributed to its ingredient herb viz *Azadirachta indica* which may increases the availability of dietary protein (Samarth et al. 2003; Obikaonu et al. 2011).

Table 4: Effect of supplementation of Methiorep on serum biochemical parameters in growers at 8th and 18th week of age.

Serum parameters	At 8th week of age			At 18th week of age		
	Control group	Methiorep supplemented group	SEM	Control group	Methiorep supplemented group	SEM
Total protein (g/dl)	3.50[a]	4.78[b]	0.127	3.04[a]	4.50[b]	0.130
Albumin (g/dl)	1.62	1.75	0.041	1.85	2.02	0.052
Phosphorus (mg/dl)	5.34	6.58	0.169	5.39	6.74	0.226
Calcium (mg/dl)	7.42	8.19	0.209	8.66	9.22	0.314
SGPT (IU/l)	37.65	31.57	1.343	46.50	44.84	0.261
SGOT (IU/l)	43.85	27.80	2.205	58.54	53.58	1.421

Means bearing different superscript within a row differ significantly, P<0.05.

EGG Production Parameters

Hen housed egg production (HHEP)

Laying chickens require a completely balanced diet to sustain maximum egg production over time. Hen housed egg production in Methiorep supplemented group birds (76.07) was significantly high (P<0.05) than the birds in control group birds (70.80) (Table 5). The results were found to be in agreement with Harms and Russell (1996) who also reported that supplementing methionine in the diet of laying hens increases the egg production.

Table 5: Effect of supplementation of Methiorep on hen housed egg production (%) of layers.

Age (weeks)	Weekly egg production (%)		
	Control group	Methiorep supplemented group	SEM
20	6.35	12.70	1.599
21	30.16	41.27	3.075
22	65.87	71.43	2.488
23	66.67	77.78	2.085
24	67.46	84.13	2.211
25	80.16	84.92	1.958
26	79.37	84.13	1.707
27	78.57	88.10	1.383
28	76.19	78.57	1.627
29	74.60	77.78	1.625
30	80.16	83.33	1.733
31	86.51	89.68	1.228
32	85.71	89.68	1.216
33	84.92	90.48	1.308
34	69.05	73.81	2.016
35	69.84	71.43	1.937
36	84.13	82.54	1.787
37	76.98	80.95	1.998
38	82.54	82.54	1.883
HHEP	70.80[a]	76.07[b]	0.601

Means bearing different superscript within a row differ significantly, P<0.05.

Feed efficiency per dozen eggs produced

The GI tract microflora is a mixture of bacteria, fungi, and protozoa, but bacteria are the predominant microorganisms (Gabriel et al., 2006). The sophisticated relationship that has evolved between the GI tract and gut microbiota allows for efficient utilization of dietary nutrients. Significantly better (P<0.05) feed efficiency per dozen eggs produced was evident throughout the study in Methiorep supplemented group (1.49) as compared to control group birds (1.65) (Table 6). The results were found to be in agreement with Sharma Ranjan (2015); Pillai et al. (2006) who also reported that supplementation of Methionine increases the feed efficiency in poultry birds.

Table 6: Effect of supplementation of Methiorep on feed efficiency per dozen eggs produced.

Age (weeks)	Weekly egg production (%)		
	Control group	Methiorep supplemented group	SEM
21	2.83	2.67	0.260
22	2.20	1.61	0.107
23	2.53[a]	1.44[b]	0.113
24	2.59	1.35	0.164
25	1.56	1.37	0.080
26	1.85	1.57	0.085
27	1.48	1.35	0.027
28	1.59	1.48	0.037
29	1.69	1.66	0.049
30	1.70	1.57	0.056
31	1.49	1.41	0.023
32	1.44	1.33	0.024
33	1.40	1.29	0.024
34	1.60	1.28	0.089
35	1.66	1.70	0.083
36	1.88	1.79	0.107
37	1.78	1.50	0.113
38	1.62	1.51	0.089
20-38 weeks	1.65[a]	1.49[b]	0.014

CONCLUSION

It may be concluded that supplementation of herbal methionine, Methiorep used in this investigation elicited significant increase in egg production, improved feed efficiency per dozen egg production and overall performance without any harmful alteration in the biochemical parameters of commercial layer chickens.

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REFERENCES

1. Chadda RC. Supply and demand of feed ingredients for poultry production. Proc: Seminar on Poultry, April 2, 1998, Hyderabad. India. pp. 67-81.
2. Al-Saffar AA, Rose SP. The response of laying hens to dietary amino acids. World's Poultry Science Journal. 2002; 58: 209 -234.
3. Marcolin E, Forgiarini LF, Tieppo J, Dias AS, Freitas LA, Marroni NP. Methionine- and choline-deficient diet induces hepatic changes characteristic of non-alcoholic steatohepatitis. Arq Gastroenterol**,** 2011; 48(1):72-9.
4. Sawada N, Poirier L, Moran S, Xu YH, Pitot HC. The effect of choline and methionine deficiencies on the number and volume percentage of altered hepatic foci in the presence or absence of diethylnitrosamine initiation in rat liver. Carcinogenesis**,** 1990; 11(2): 273-81.
5. Bender DA. Amino acid metabolism. 1st ed., New York, John Wiley and Sons: 1985.
6. Waghmare DL, Ranade AS, Desai DN, Patil MB, Avari PE. Evaluation of oil fortified with herbs on performance of broilers. J Bombay Vet Coll, 2006; 14: 1-2.
7. Ramnath V, Rekha, PS, Sujatha KS. Amelioration of heat stress induced disturbances of antioxidant defense system in chicken by brahma rasayana. eCAM, 2008; 5: 77-84.
8. Halder G, Roy B**.** Effect of Herbal or Synthetic Methionine on Performance, Cost Benefit Ratio, Meat and Feather Quality of Broiler Chicken. Int J Agri Res, 2007; 2(12): 987-96.
9. Narayanswamy HD, Bhagwat VG. Evaluating the efficacy of methionine supplementation options in commercial broiler chickens. Poultry Line, 2010; 3: 5-7.
10. Samarth VR, Dakshinkar NP, Jagtap DG, Bhojne GR. Effect of Aswagandha (Withania somnifera) on haematobiochemical profile of broilers. Indian Journal of Animal Sciences, 2003; 73(6): 648-49.
11. Obikaonu HO, Okoli IC, Opara MN, Okoro VMO, Ogbuewu IP, Etuk EB, Udedibie ABI. Haematological and serum biochemical indices of starter broilers fed neem (Azadirachta indica) leaf meal. Journal of Animal and Feed Research, 2011; 1(4): 150-54.
12. Harms RH, Russell GB. A re-evaluation of the methionine requirement of the Commercial layer. Journal of Applied Animal Research, 1996; 9: 141–151.
13. Sharma A, Ranjan S. Comparative effects of DL-Methionine and N-Methionine on growth performance and biochemical parameters of broilers. International Journal of Current Research, 2015; 7(7): 17689-692.
14. Pillai PB, Fanatico AC, Beers KW, Blair ME, Emmert JL. Homocysteine remethylation in young broilers fed varying levels of methionine, choline and betaine. Poult Sci, 2006; 85: 90-95.