Bangl. J. Vet. Med. (2004). 2 (1) : 45–48

EFFECTS OF VITAMIN- MINERAL PREMIX SUPPLEMENTATION ON BODY WEIGHT AND CERTAIN HAEMATO-BIOCHEMICAL VALUES IN BROILER CHICKENS

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ABSTRACT

This experiment was conducted to study the effect of vitamin-mineral premix supplementation on body weight gain and certain haemato-biochemical parameters in 20 broiler chickens of Shaver Star Bro strain, aged 20 days old during the period from 21st January to 10th February 2002. The chickens of three groups fed with a commercial ration supplemented with vitamin-mineral premix (Provita®, Arifs Bangladesh Ltd.) @ 1%, 2%, and 4% of total feed for a period of 21 days. Significantly ($p < 0.05$) higher body weight gain was recorded on 7th, 14th and 21st days of experiment in all the supplemented groups in comparison to control. Among the treated groups, highest body weight gain was recorded in 4% vitamin-mineral supplemented group (2007 ± 4.88 g) and lowest in 1% supplemented group (1823 ± 6.24 g) at 21st day of experiment. Haematological study revealed insignificant increase in TEC, Hb, ESR and PCV in all the vitamin-mineral premix supplemented groups. The lymphocytes were increased at a dose dependent manner and were significantly ($p < 0.05$) higher (68.60 ± 0.49) in 4% vitamin-mineral supplemented group but the heterophils were significantly ($p < 0.05$) lower (25.20 ± 0.38) in that group at 21st days of experiment. Total serum protein, albumin and globulin values were significantly ($p < 0.05$) increased in 2% (11.48 ± 0.34 mg / dl, 6.64 ± 0.30 mg / dl and 4.84 ± 0.13 mg / dl respectively) and 4% (15.20 ± 0.17 mg / dl, 8.98 ± 0.08 mg / dl and 6.22 ± 0.10 mg / dl respectively) vitamin-mineral supplemented groups. It is therefore, suggested that supplementation of vitamin-mineral premix with commercial poultry ration is essential for proper growth and body resistance of poultry.

Key words : Effects, vitamin-mineral premix, body weight, haemato-biochemical values, broiler chickens

INTRODUCTION

Poultry industry is a growing industry in Bangladesh. But poultry industries have faced some problems; deficiency diseases are the major one. In ordinary ration vitamin and mineral deficiencies usually occur. In comparison to other species, chickens are more susceptible to vitamin deficiency because gut flora can synthesize very little vitamins and intensively kept chickens undergo many stresses (Ward, 1996). It has been observed that mineralization and body growth is reduced in Ca, P, Mg, and Vit-D deficiencies (Hart *et al.*, 1930) Cessation of growth, weakness, incordination, ruffled feathers, ataxia, blindness and xerophthalmia are common in Vit-A (Hill *et al.*, 1961), rickets and osteomalacia in Vit-D (Lillie and Bird, 1949), polynurities, curled toe paralysis, perosis, impairment of food utilization in Vit-B complex deficiencies (Briggs *et al.*, 1942). However, addition of vitamin and mineral premixes to poultry ration is a good assurance to protect birds from deficiency diseases and disorders. The present paper describes the effects of vitamin-mineral premix supplementation on body weight gain, and certain haemato-biochemical values in broiler chickens.

MATERIALS AND METHODS

The present research was conducted in the Department of Physiology, Faculty of Veterinary Science, BAU, Mymensingh to study the effects of vitamin-mineral premix supplementation on body weight gain and haemato-biochemical values in broiler chickens during the period from 21st January to 10th February 2002. A total of 20-day-old broiler chickens of "Shaver Star Bro" strain were purchased from Biman Poultry Complex, Dhaka and reared in the experimental poultry shed of the Department of Physiology, BAU, Mymensingh with commercial feed (Quality Feeds Ltd., Dhaka) and fresh tubewell water *ad libitum*. At 20 days old, the chickens were divided into four equal groups (A, B, C and D), each consisting of 5 chickens. The chickens (20-day-old) of group B, C and D supplemented with of vitamin-mineral premix (Provita®, Arifs Bangladesh Ltd.) along with commercial feed (Quality Feeds Ltd., Dhaka) @ 1%, 2%, and 4% of total feed up to the end of the 21 days of experimental period, whereas group A served as control fed with commercial feed (Quality Feeds Ltd., Dhaka) only. Routine vaccination was done properly.

Body weight of the chickens of all the groups was weighed at pre-treatment (20 days old) and at 7th (27 days old), 14th (34 days old) and 21st (41 days old) days of post-treatment conditions. All the birds were sacrificed to collect blood sample in double oxalate containing and plain tubes for haematological and biochemical studies, respectively at the end of 21 days of experimental period. Total erythrocyte count (TEC), haemoglobin content (Hb), packed cell volume (PCV), erythrocyte sedimentation rate (ESR) and differential leukocyte count (DLC) were determined as per technique described by Shastry (1983). The biochemical values such as total serum protein (TSP), albumin and globulin were determined as per technique described by Weichselbaum and Amer (1946) with "Humalyzer-2000" (Human).

Data obtained were analyzed statistically for mean, standard error and Student's 't'-test according to the standard procedures as described by Snedecor and Cochran (1980).

RESULTS AND DISCUSSION

Body weight of different groups of birds at pre- and post-treatment is presented in Table 1. Vitamin-mineral premix supplementation showed a significant ($p < 0.05$) increased gain in body weight on day 7th, 14th, and 21st days of experiment in all the treated groups in comparison to control. Among the treated groups, highest body weight gain was recorded in birds of group D (4% supplementation of total feed) and lowest in group B (1% supplementation of total feed). The increased rate of body weight might be due to the supplementation of vitamin-mineral premix which increased feed intake, efficiencies of feed utilization and enhanced digestion, absorption and metabolism of supplied feed nutrient specially of protein which is essential for their health and body weight gain. The increased weight gain in present findings resembles the findings of Deyhim *et al.* (1995) and Gavrilona *et al.* (1989) who reported that vitamin added to basal low vitamin diet increased the growth of broiler chickens by 5 to 12%.

Table 1. Effect of vitamin-mineral premix (Provita®, Arifs Bangladesh Ltd.) supplementation at different doses on body weight gain in broiler chickens (mean ± SE)

Groups	No. of chickens	Body weight (g)			
		Pre-treatment Day 0 (20-day-old)	Post-treatment		
			Day 7 (27-day-old)	Day 14 (34-day-old)	Day 21 (41-day-old)
A (Control)	5	680 ± 4.47	1046 ± 4.85	1402 ± 5.65	1760 ± 7.07
B (1% supplemented)	5	675 ± 4.47	*1065 ± 7.41	*1486 ± 5.10	*1823 ± 6.24
C (2% supplemented)	5	680 ± 4.47	*1088 ± 6.63	*1528 ± 8.00	*1914 ± 5.10
D (4% supplemented)	5	682 ± 4.47	*1110 ± 4.47	*1604 ± 5.10	*2007 ± 4.88

*Indicates significant at $p < 0.05$.

The results of haematological (TEC, Hb, PCV, ESR and DLC) and biochemical (TSP, albumin and globulin) values of the chickens are shown in Table 2. In all the treated groups, TEC, Hb, PCV were gradually increased with increased doses of vitamin-mineral supplementation but these values were not statistically significant. The lymphocytes, monocytes, heterophil, eosinophil and basophil were within the normal range in all the treated groups but in the group D, the heterophil count was lowest (25.20 ± 0.38) and lymphocytes were highest (68.80 ± 0.49) and statistically significant ($p < 0.05$) to that of group A and B (Table 2). It may be due to trace concentration of vitamin and mineral premix supplementation on diet of broiler have no direct effect on haemopoietic organs although individual vitamin and mineral component have direct effect on haemopoietic organs but required large doses. These findings are in accordance with Ghoshal *et al.* (1986) and Tras *et al.* (2000) who reported that a diet without of Vit-B and Vit-C resulted marked atrophy of the lymphoid organ.

The values of total serum protein, albumin and globulin in the treated and untreated groups of birds are presented in Table 2. It was found that the values of total serum protein, albumin and globulin were significantly ($p < 0.05$) increased in group C (11.48 ± 0.34, 6.64 ± 0.30 and 4.84 ± 0.13 mg / dl respectively) and D (15.20 ± 0.17, 8.98 ± 0.08 and 6.22 ± 0.10 mg / dl respectively) in comparison to group A (10.12 ± 0.21, 6.06 ± 0.08 and 4.04 ± 0.14 mg / dl respectively) and B (10.56 ± 0.18, 6.04 ± 0.29 and 4.52 ± 0.17 mg / dl respectively). Among the treated groups, these values were highest in group D (15.20 ± 0.17, 8.98 ± 0.08 and 6.22 ± 0.10 mg / dl respectively). This finding supports the earlier finding of Huff *et al.* (1992) who reported that vitamin-mineral supplementation significantly increased body resistance capacity, serum protein and albumin.

Table 2. Effects of vitamin-mineral premix (Provita® Arifs Bangladesh Ltd.) supplementation at different doses on haemato-biochemical parameters in broiler chickens at 21st day of treatment (mean ± SE)

S / N*	Parameters	Unit	Groups (n = 5)			
			A (Control)	B (1% supplemented)	C (2% supplemented)	D (4% supplemented)
1.	TEC	10^6 / mm^3	2.86 ± 0.04	2.94 ± 0.04	2.97 ± 0.04	2.99 ± 0.04
2.	Hb	g / dl	7.68 ± 0.13	7.70 ± 0.25	7.80 ± 0.19	7.90 ± 0.19
3.	PCV	%	32.40 ± 0.74	32.60 ± 0.87	32.80 ± 0.49	33.00 ± 0.89
4.	ESR	mm in 1st h	1.80 ± 0.29	1.80 ± 0.12	1.70 ± 0.22	1.70 ± 0.12
5.	Heterophil	%	31.60 ± 0.51	31.00 ± 0.71	28.60 ± 0.51	*25.20 ± 0.38
6.	Eosinophil	%	3.00 ± 0.32	3.20 ± 0.20	2.60 ± 0.25	2.80 ± 0.38
7.	Basophil	%	1.40 ± 0.25	1.40 ± 0.25	1.00 ± 0.00	1.00 ± 0.00
8.	Lymphocyte	%	60.40 ± 0.51	61.20 ± 0.66	64.80 ± 0.49	*68.80 ± 0.49
9.	Monocyte	%	3.60 ± 0.25	3.40 ± 0.32	2.80 ± 0.38	2.80 ± 0.38
10.	TSP	mg / dl	10.12 ± 0.21	10.56 ± 0.18	*11.48 ± 0.34	*15.20 ± 0.17
11.	Albumin	mg / dl	6.06 ± 0.08	6.04 ± 0.29	*6.64 ± 0.30	*8.98 ± 0.08
12.	Globulin	mg / dl	4.04 ± 0.14	4.52 ± 0.17	*4.84 ± 0.13	*6.22 ± 0.10

* Indicates significant at $p < 0.05$.

It is therefore, suggested that supplementation of vitamin-mineral premix with commercial poultry ration has influences on body weight gain and haemato-biochemical values and is essential for proper growth, body resistance and decreased mortality rate of poultry specially on growing chicks.

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