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Effect of Feeding Synthetic and Herbal Vitamin E on Performance of Broiler Chicks in Hot Arid Zone of Rajasthan

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ABSTRACT

One hundred thirty five (135) unsexed day-old, commercial broiler chicks were weighed individually and uniformly distributed as 45 chicks in three groups (T1, T2 and T3). Each group was divided into three replicates with 15 chicks in each. The chicks were fed with starter mash which contained crude protein 23% and metabolizable energy 2905 Kcal/kg up to three weeks of age and from 4 to 6 weeks of age the chicks were fed with finisher mash which contained crude protein 20% and metabolizable energy 3120 Kcal/kg. In group T1 herbal vitamin E was added @ 50 g/ton of feed and group, T2 herbal vitamin E was added @ 100 g/ton of feed and T3 synthetic Vitamin E @ 100g/ ton was added. Growth and feed consumption of broilers in experimental group i.e. T1 (basal diet + herbal vitamin E @ 50 g/ton) but feed conversion ration of T3 (basal diet+ synthetic vitamin E @ 100g/ton) was better than that recorded on control diet.

Keywords: Broiler, Feed conversion ratio, Herbal, Performance, Synthetic, Vitamin E

Poultry constitutes an important aspect of animal husbandry in India and broiler industry has emerged as the most dynamic and rapidly growing segment of poultry rearing because of its assured returns, short generation interval and limited land requirements. Broiler meat is good source of protein and free from any type of social taboos. The economics of broiler production is very important criteria for assessing profit and feed is the major factor affecting the productive performance and economics of broiler production as it constitutes 70-75% of the total cost of production. It is well documented that growth and immunocompetence of chickens and turkeys are influenced by dietary vitamin E (Sell *et al.*, 1997). Vitamin E (α-tocopherol) is a crucial lipid-soluble antioxidant that protects unsaturated fatty acids by terminating chain reaction involving fatty acid peroxyl radicals (Machlin, 1991). Vitamin E deficiency in chicks may lead to the deficiency disorders like exudative diathesis, muscular dystrophy and encephelomalacia. Keeping in view the above facts, the present study was undertaken to study the Comparative effect of Herbal and Synthetic vitamin E on broiler performance.

MATERIALS AND METHODS

One hundred and Thirty five (135) unsexed day-old, commercial broiler chicks were weighed individually and uniformly distributed as 45 chicks in two groups. Each group was divided into three replicates with 15 chicks in each. The birds were offered feed and water *ad libitum*. The chicks were fed with starter mash which contained crude protein 23% and metabolizable energy 2905 Kcal/kg up to three weeks of age. For next 3 weeks i.e. from 4 to 6 weeks of age with finisher mash which contained crude protein 20% and metabolizable energy 3120 Kcal/kg. Group T1 herbal vitamin E was added @ 50g/ton, group T2 herbal vitamin E was added @ 100g/ton of feed and group T3 synthetic vitamin E was added @ 100 g/ton.

Adequate and identical floor, feeding and watering space were provided to chicks of both groups throughout the experiment. Earthen vessels were used to provide water. The detailed composition of the basal ration (both starter and finisher) used for feeding the chicks is presented in Table 1.

Table 1: Composition of basal ration fed to the chicks

Ingredient	Starter Ration (Parts per 100)	Finisher Ration (Parts per 100)
Maize	39	48
Wheat bran	9	8
Rice polish	8	6
Ground nut cake	30	26
Fish Meal	10	6
Mineral Mixture	2	2
Ground nut oil	2	4
Total	**100**	**100**
Projected		
Composition C P	**23.1046**	**20.1532**
Energy (Kcal/Kg)	**2905.56**	3120.02

The different experimental feeding diet groups were formulated as mentioned in the Table 2.

Table 2: Number of broiler chicks assigned randomly to various experimental groups

Treatments		Replicates			Total Chicks
		I	II	III	
T_1	Basal diet + Herbal vitamin E (50 g/ton)	15	15	15	45
T_2	Basal diet + Herbal Vitamin E (100 g/ton)	15	15	15	45
T_3	Basal diet +Synthetic Vitamin E (100 g/ton)	15	15	15	45

The data obtained in this experiment were analyzed using conventional statistical procedure as suggested by Snedecor and Cochran (1994) and significance of mean differences was tested by Duncan's new multiple range test.

RESULTS AND DISCUSSION

The parameters studied were average weekly live body weight, weekly gain in body weight, weekly feed consumption and feed conversion ratio.

Body weight

The analysis of variance and the means along with their respective standard errors of weekly body weight in different treatment groups are presented in table 3 and depicted in Fig. 1.

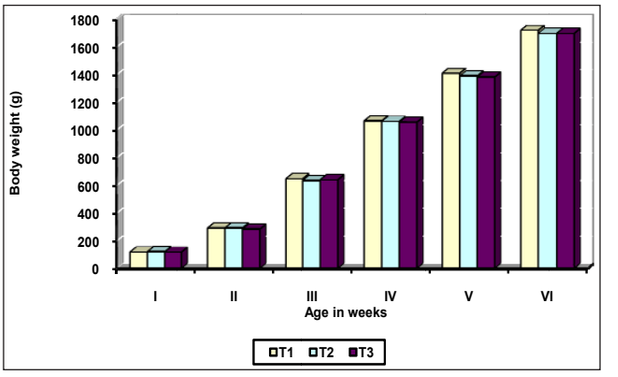

Fig. 1: Effect of synthetic and herbal vitamin E on body weight at different weeks

At first week of age, maximum mean body weight was observed in T_2 group (119.93 ± 1.75 g). This was followed by T_1 group (117.46 ± 1.8g) and T_3 group (117.22 ± 1.74 g) respectively. The mean body weight of the T_1 group, T_2 group and T_3 group did not differ significantly among themselves. At second week of age, the mean body weight of chicks was highest in T_2 group (290.93 ± 4.54 g). This was followed by T_1 group and T_3 group. At the end of week III, the mean body weight of chicks of T_1 group comprising Herbal vitamin E (50g/ton) was found to be highest (646.73 ± 10.03g) followed by T_3 group and T_1 group. The mean body weight of the T_1, T_2, and T_3 group did not differ significantly among themselves. At fourth week of age, significantly highest mean body weight was attained by chicks of group T_1 (1064.82 ± 16.56g). At five and sixth weeks of age, same trend as that of week fourth was observed, T_1 group followed by T_2 group, T_3 group, that all the three groups did not differ significantly. These results were in agreement with Silva *et al.* (2011).

Body weight gain

The means with their respective standard errors of weekly body weight gain in different treatment groups are presented in table 3 and depicted in Fig. 2.

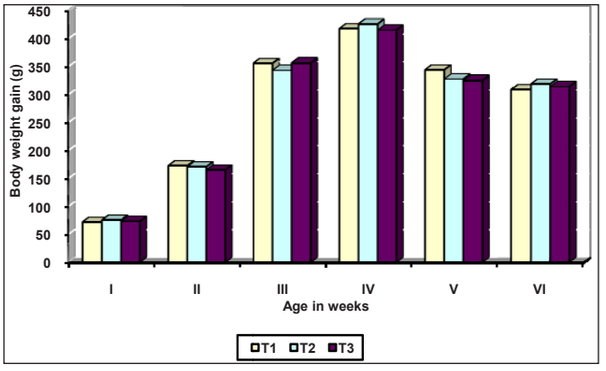

Fig. 2 : Effect of synthetic and herbal vitamin E on body weight gain at different weeks

The means for body weight gain of broiler chicks at week I indicated that group T_2 chicks fed herbal vitamin E (100 g/ton) had highest body weight gain (75.66 ± 1.10g) this was followed by T_3 group and T_1 group.

The means for body weight gain of broiler chicks at week II indicated that group T_1 (172.93 ± 2.97g) has significantly highest body weight gain. This was followed by T_2 group and T_3 group. Similarly, at week III, the mean body weight gain of chicks was highest in group T_3 (356.71 ± 5.30g) followed by T_1 group and T_2 group, these three groups had no significant difference among themselves. Likewise, at IV week of age significantly highest average body weight gain was attained by chicks of treatment T_2 group (426.55 ± 8.32g). There was no significant difference among these three groups. At week V, the significantly highest mean body weight gain was found in T_1 group (344.45 ± 7.43g) and group T_2 (327.87 ± 12.11g). Intermediate body weight was found in group T_3 group (325.55 ± 4.89g). Week VI followed the same pattern as that of groups II, III and IV. The weight gain at this week (VI) was lower the week V, it might be attributed to the highest temperature during week VI as compared to temperature during week V and period

Table 3: Means with respective standard errors for body weight (g), body weight gain, feed consumption and feed conversion ratio at different weeks

Treatment	Body weight						
	Age in weeks						
	I	II	III	IV	V	VI	
T_1	117.46^{a}±1.8	290.39^{a}±4.73	646.73^{a}±10.03	1064.82^{a}±16.56	1409.28^{a}±22.99	1718.78^{a}±26.75	
T_2	119.93^{a}±1.75	290.93^{a}±4.54	634.50^{a}±9.58	1061.05^{a}±15.62	1388.93^{a}±23.30	1696.93^{a}±24.99	
T_3	117.22^{a}±1.74	282.76^{a}±4.42	639.48^{a}±9.60	1054.92^{a}±15.83	1380.48^{a}±20.73	1696.17^{a}±25.95	
Treatment	**Body weight gain**						
	Age in weeks						
	I	II	III	IV	V	VI	
T_1	72.37^{a}±1.11	172.93^{a}±2.97	356.33^{a}±5.47	418.09^{a}±6.68	344.45^{a}±7.43	309.50^{a}±6.06	
T_2	75.66^{a}±1.10	171.00^{a}±2.85	343.56^{a}±6.01	426.55^{a}±8.32	327.87^{a}±12.11	319.01^{a}±4.94	
T_3	73.27^{ab}±1.09	165.53^{a}±2.72	356.71^{a}±5.30	415.44^{a}±6.22	325.55^{a}±4.89	314.36^{a}±4.79	
Treatment	**Feed consumption**						
	Age in weeks						
	I	II	III	IV	V	VI	I-VI
T_1	192.65^{b}±0.90	454.35^{b}±4.26	982.78^{c}±13.18	1174.78^{b}±16.26	957.02^{bc}±15.78	851.55^{b}±2.94	4613.15^{b}±16.17
T_2	195.75^{b}±5.29	447.95^{ab}±9.44	903.35^{b}±11.62	1142.60^{b}±5.96	863.35^{a}±29.38	842.00^{b}±5.46	4395.03^{b}±56.95
T_3	191.50^{b}±4.37	422.15^{a}±9.50	941.61^{bc}±14.55	1135.20^{b}±18.70	875.04^{ab}±8.51	858.74^{b}±10.03	4424.26^{b}±31.91
Treatment	**Feed conversion ratio**						
	Age in weeks						
	I-III		IV-VI		I-VI		
T_1	2.68 ± 0.04^{a}		2.78 ± 0.01^{a}		2.73 ± 0.30^{a}		
T_2	2.61 ± 0.05^{a}		2.65 ± 0.01^{a}		2.63 ± 0.02^{a}		
T_3	2.60 ± 0.04^{a}		2.71 ± 0.01^{a}		2.65 ± 0.01^{a}		

prior to it. Significantly highest overall mean body weight gain (week I-VI) was observed in T_1 group (1673.70 ± 26.06g), T_2 (1652.67 ± 24.35g) and group T_3 (1643.90 ± 26.06g). There was no significant difference among these three groups.

The result observed in the study are in agreement with the reports of Singh *et al.* (2005), Chae *et al.* (2005) and Shaiks *et al.* (2006).

Feed conversion ration

Feed conversion ratio (FCR) or feed conversion efficiency (FCE) i.e. output in terms of body weight gain in relation to feed consumption is one of the most important parameter to be given due consideration presented in Table 3 and Fig. 3.

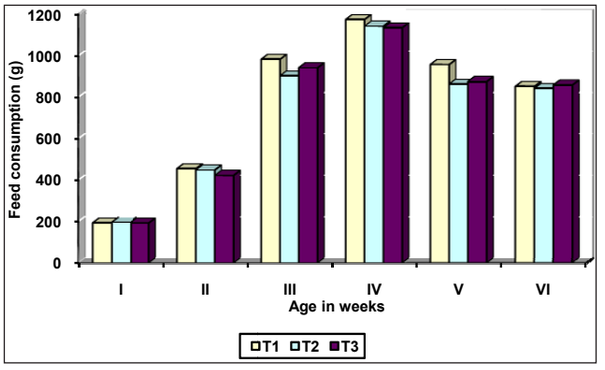

Fig. 3: Effect of synthetic and herbal vitamin E on feed consumption at different weeks

The means feed conversion ratio at the starter phase (I-III weeks) was significantly best in T_3 group (2.60 ± 0.04) followed by T_2 group (2.61 ± 0.05) and T_2 group (2.68 ± 0.04), but there was no significant difference among them. The feed conversion efficiency at this stage revealed that Herbal vitamin E helped in efficient utilization of feed which resulted in significantly lower feed conversion ratio over control. At finisher phase (week IV-VI) the mean feed conversion ratio was significantly best in T_2 group (2.65 ± 0.01). Which was followed by group T_1 (2.78 ± 0.01) and T_3 (2.71 ± 0.01). The overall feed conversion efficiency (week I-VI) best feed conversion efficiency was observed in group T_2 (2.63 ± 0.02), but there was no significant difference among the means of these three groups. The best FCR of herbal vitamin E i.e. group T_2 might be due to less feed intake and moderately higher weight gain, as compare to other groups. The results of significantly better feed conversion ratio due to incorporation of herbal vitamin E are similar to those of Panda *et al.* (2004), Shaik *et al.* (2005), Baruah *et al.* (2006) and Liu *et al.* (2009), all of whom observed significant effect on feed conversion ratio by supplementing control diet with vitamin E.

Feed consumption

The most important factor affecting the profitability in broiler farming is feed cost which accounts for 70-75% of the total cost of broiler rearing. Hence, it is necessary to study the effect of various treatments on feed intake of broiler chicks. While the means with their standard errors are shown in table 3 and depicted in Fig. 4.

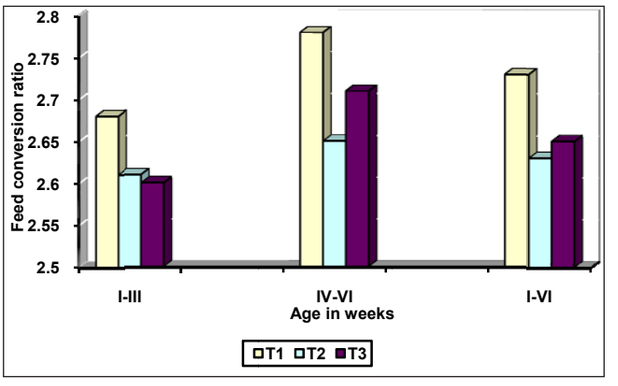

Fig. 4: Effect of synthetic and herbal vitamin E on feed conversion ratio

During week I, average feed consumption by the broiler chicks was significantly highest in T_2 group (195.75 ± 5.29g) followed by T_1 group (192.65 ± 0.90g) and lowest in group T_3 (191.50 ± 4.37 g), which differ non-significantly among them. During week II, highest feed intake was observed in control group T_1 (454.35 ± 4.26 g), followed by T_2 group (447.95 ± 9.44 g) and T_3 group (422.15 ± 9.50 g). The mean feed consumption during week III of the experiment was recorded to be significantly highest in group T_1 (982.78 ± 13.18g). Lowest in group T_2 (903.35 ± 11.62 g). The mean feed intake of group T_2 was significantly lowest from the remaining two groups. During week IV, the average feed consumption was in group T_1 (1174.78 ± 16.26g), succeeded by group T_2 (1142.60 ± 5.96). Mean feed intake during week V revealed significantly highest

feed consumption in group T_1 (957.02 ± 15.78 g), this was followed by group T_1 (957.02 ± 15.78) and lowest in group T_2 (863.35 ± 29.38g). The mean feed consumption during week VI of the experiment recorded highest in group T_1 (851.51 ± 2.94g), followed by group T_2 and T_3. The results of the present study of supplementing herbal vitamin E are akin to those of Chatterjee and Agarwal (2005), Shaik *et al.*(2005), Kumar and Singh (2005), Oliveros (2006) and Liu *et al.* (2009), who observed significant improvement in feed consumption.

CONCLUSION

The results of the present study revealed that body weight, weight gain and feed consumption were on higher side by inclusion of herbal vitamin E @ 50g/ton, during starter phase (week I-III) and finisher phase (week IV-VI). The feed conversion ratio was significantly better in herbal T_2 group as compared to T_3 and T_1 group, at starter phase (week I-III), finisher phase (week IV-VI) and overall (week I-VI). The current level of herbal vitamin E present in the feed improved the performance of broilers up to marketable age reared in a high temperature environment.

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