Progress. Agric. 22(1 & 2): 97 – 103, 2011 ISSN 1017-8139

EFFECT OF COMBOzyme® AND Renasol AD_3E® ON BODY WEIGHT AND HEMATOLOGICAL PARAMETERS IN BROILER CHICKEN

A. Mustari, S. Rana and M. M. Rahman
Department of Physiology, Bangladesh Agricultural University
Mymensingh-2202, Bangladesh

ABSTRACT

The present research work was undertaken to study the effect of multi enzymes and vitamin AD_3E on body weight and hematological parameter (TEC, Hb Concentration and ESR) in growing broilers fed with enzyme and vitamin AD_3E with normal broiler ration. 20 broiler chickens of 10 (ten) days old "Hubbard Classic" were taken for study. The chicks were divided randomly into four groups with five chicks in each group. Group A designated as control group and was given normal broiler ration and rest of the groups were given enzyme and vitamin preparation. Group B was given enzyme only, group C was given vitamin only and group D was given both enzyme and vitamin as per schedule. It was observed that enzyme and vitamin AD_3E preparation enhanced the growth rate of broilers. On the final day of experiment the body weight was significantly increased ($P<0.01$) in the treated groups in comparison to that of control group, TEC, Hb concentration and ESR values were significantly ($P<0.01$) increased in all treated groups than the control group and among the treated groups vitamin AD_3E showed lowest performance.

Key Words: Enzymes, Broilers, Body weight, Hematological

INTRODUCTION

A number of feed additives like antibiotics, steroids, vitamin, minerals and other growth promoters have been used to improve the growth performance of broiler (Raha, 2009). The excessive dependency on medications threatens the mankind in antibiotic resistance. However, it is also discouraged to use growth promoters because of their residual effect in boiler meat.

Enzymes such as amylases and proteases break down large molecules (starch or proteins, respectively) into smaller ones, so they can be absorbed by the intestines. Exogenous multi-enzymes preparations capable of degrading a wide variety of substrates found in different raw materials are now being used to increase the value of feed materials and in turn, decreasing feed cost. In this regard, a series of trails were conducted to determine the effectiveness of multi-enzyme preparation containing high enzymatic activities of xylase, glucanase, galactosidase and mannanase in poultry.

Vitamin plays an important role in both nutrition and production. The optimum vitamin mineral premix supplementation are required for poultry growth and formulating

premixes are to be necessary (Mc Dowel, 1989). Deficiency of vitamin causes various diseases and disease condition in poultry such as cessation of growth, weakness, ruffled plumage, ataxia, blindness, xerophthalmia due to deficiency of vitamin A (Hill *et al*., 1961). Now, various types of vitamin AD_3E are available in the market. Renasol AD_3E is a commercial product marketed by Renata Animal Health which contains vitamin A, vitamin D_3 and vitamin E.

Since multi-enzymes and vitamin AD_3E are claimed to improve the performance, so an experiment was undertaken on the comparative growth performance of these products which help the farmers to select the appropriate product that is more potent growth promoter.

The experiment was conducted from March /11 through April/11, at Raimony, Trishal, Mymensingh and the hematological parameters were measured in Physiology department, BAU, Mymensingh.

MATERIALS AND METHODS

Experimental design

20 broiler chicks of 10(ten) days old "Hubbard Classic" were randomly divided into four (4) equal groups (5×4) and numbered them as group A, B, C and D. Group A was considered as control. Group B was treated with supplementation of 1gm enzymes/L drinking water. Group C was treated with supplementation of 1 ml vitamin AD_3E/3L drinking water and group D was treated with supplementation of 1gm enzymes plus 1ml vitamin AD_3E/3L drinking water. Initial body weight was recorded at day 1 and 7 days interval up to the end of the 21 days of experimental period and the birds were sacrificed to collect blood sample for hematological study (TEC, Hb and ESR).

Composition of CMBOzyme(R)

Enzyme	Amount
Cellulose	1,325,000 cu units/kg
Fungal Amylase	30,000 SKB Units/kg
Fungal Protease	1,000,000 HUT units/kg
Neutral protease	100000 PC units/kg
Xylanase	1.2 Anson units/kg
Beta Glucanase	20,000 BG units/kg
Hemicellulase	20,000 HC units/kg
Lipase	75000 FIP units/kg
Phytase	200,000 FTY units/kg

Source: Product catalogue American Biosystem

Composition of Renasol $AD_3E^{(R)}$

Components	Amount
Vitamin A	10000000 IU/L
Vitamin D_3	2000000 IU/L
Vitamin E	2000 mg/L

Source: Renata Animal Health Division, Bangladesh

Record keeping and calculation of data

The following parameters were recorded during the experimental period.

a) Body weight

Body weight of chicks were recorded on first day and then weekly for each treatment. In each week, birds were weighed early morning prior to feeding.

b) Determination of blood parameters

1. Estimation of Hemoglobin (Hb) by acid hematin method
2. Total Erythrocyte Count (TEC) by hemocytometry method
3. Determination of Erythrocyte Sedimentation Rate (ESR) by Wintrobe's method

Statistical analysis

The recorded data were complied and tabulated for statistical analysis. The data were analyzed statistically between control and treated group of broiler chicken by 't' test.

RESULTS AND DISCUSSION

Effect on body weight

The effects of enzyme and vitamin AD_3E on the body weight of broilers are presented at Table 1 and Fig. 1.

Table 1. Effect of enzyme and vitamin AD_3E on body weight (gm) in broiler

Group	Drug	Pre treatment	Post treatment			Weight gain (%)
		Day 1	Day 7	Day 14	Day 21	
Group A	Control	106.2±3.52	329.68±4.04**	821.82±5.76**	1051.95±7.78**	89.90
Group B	Enzyme	113.36±2.88	394.63±4.91**	911.34±6.64**	1638.74±8.81**	93.08
Group C	Vit. AD_3E	102.22±3.21	353.97±5.77**	845.60±3.21**	1407.63±10.52**	92.73
Group D	Enzyme and Vit. AD_3E	109.54±4.48	376.40±4.48**	900.16±5.76**	1527.53±7.57**	92.82

Values indicate the mean ±standard error, ** = significant at 1% level

On day 10 (first day of experiment) the body weight was 106 ± 3.52 gm, 113.36 ± 2.88 gm, 102.22 ± 3.21 gm and 109.54 ± 4.48 gm in group A,B,C and D respectively. The highest body weight was recorded in group D and lowest in group C and body weight gain was statistically significant (P<0.01).

The body weight gain on day 21 of experiment was control 1051.95 ± 7.78 gm, 1638.74 ± 8.81 gm, 1407.63 ± 10.52 gm and 1527.53 ± 7.57 gm in group A, B, C, and D respectively. It was observed that the body weight gain was significantly varied with the advancement of age and of treatment. The highest gain was observed in group B and the lowest was observed in group A. But among the treated groups the lowest gain was observed in group C than D and B. The body weight gain in group B treated with enzyme only was highest than chicks treated with only vitamin group C and enzyme and vitamin group D. This result is agreed with Cowieson *et al*. (2006), Meng *et al*. (2005) and Wang *et al*. (2005). All the authors observed the same result.

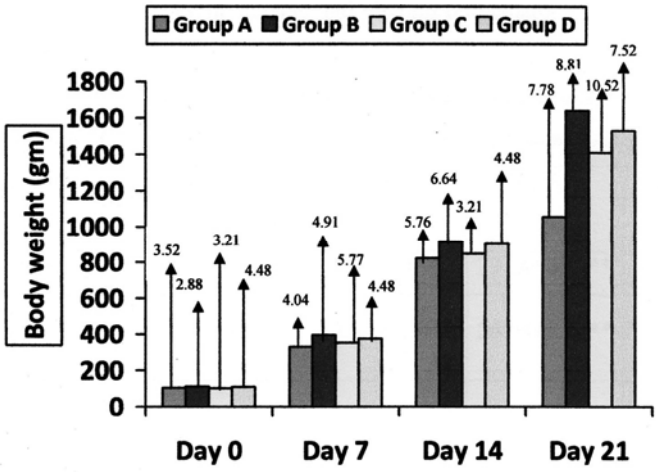

Fig. 1. Effect of enzyme and vitamin AD_3E on body weight in broilers

Effects on total erythrocyte count (TEC)

The effect of multi enzymes and vitamins on total erythrocyte count is presented in Table 2 and Fig. 2.

On day 21 of experiment the TEC in control group A was 2.32 ± 0.043 where as in group B it was 2.82 ± 0.008, in group C it was 2.57 ± 0.013, and in group D it was 3.09 ± 0.039. The highest TEC value was observed in group D and the lowest in group A all data on day 31 age were statistically significant (P<0.01). TEC was increased, because growth enhancer and nutrients are supplied properly. So, TEC was gradually improved in group B, C and D. But in control group A, TEC was decreased in comparison to treatment groups because it lacks growth promoters and nutrients. Among the treatment groups lowest TEC was found in group C.

Table 2. Hematological parameters (mean ± SE) in broilers on 21st day of experiment after treated with multi enzymes and vitamin AD_3E

Groups	TEC (million/mm^3)	Hb (gm/dl)	ESR (mm in 1st hour)
A (control)	2.32 ± 0.043**	7.11 ± 0.09**	4.11 ± 0.33*
B (multienzymes)	2.82 ± 0.008**	7.22 ± 0.14**	6.14 ± 0.88*
C (Vitamin AD_3E	2.57 ± 0.013**	7.19 ± 0.08**	7.21 ± 0.54
D (multienzymes ± Vitamin AD_3E	3.09 ± 0.039**	7.92 ± 0.06**	5.36 ± 0.58*

* Significant at 5% (P<0.05) level of probability, ** = Significant at 1% (P<0.01) level of probability

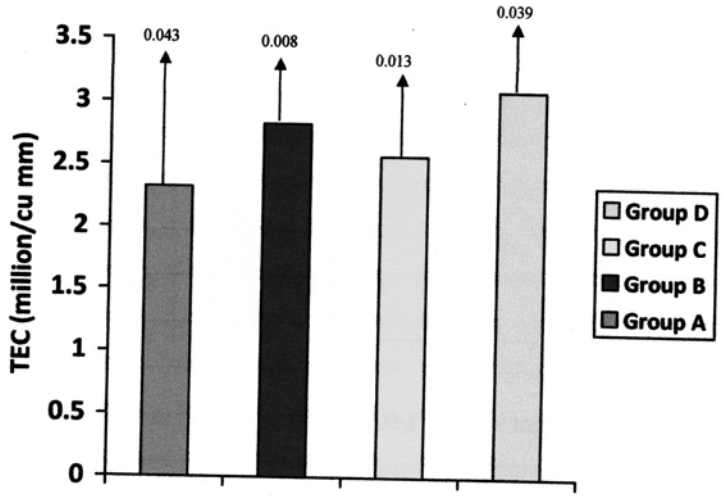

Fig. 2. Effect of enzyme and vitamin AD_3E on TEC (million/mm^3) in broilers

Effect on hemoglobin (Hb) content (gm %), (mean ± SE)

Hemoglobin (Hb) content in different groups of birds is presented in Table 2, Fig. 3. On day 21 of experiment the Hb in control group A was 7.11 ± 0.09 whereas in group B was 7.22 ± 0.14, in group C was 7.19 ± 0.08, and in group D was 7.92 ± 0.08. The highest Hb value was observed in group D and the lowest in group A and all data on day 21st were statistically significant (P<0.01). All the data catalogued in Table 4, Fig. 3 shows that the Hb count increased significantly (P<0.01) in day 21 than the normal value. This change agrees with the study of Cetin *et al.* (2005).

Effect on erythrocyte sedimentation rate (ESR) (mm in 1st hour)

Erythrocyte sedimentation rate in different groups of birds are presented in Table 2, Fig. 4. On day 31 (day-21th of experiment) of experiment the ESR in control group A was 4.11 ± 0.33 where as in group B was 6.14 ± 0.88, in group C was 7.21 ± 0.54 and in group D was 5.36 ± 0.58. The highest ESR was observed in group C and the lowest in group A and all data except group C on day 31 were statistically significant (P<0.05). Group B showed

lowest ESR among the treatment groups but more than control group which supports the result of Wang *et al.* (2009).

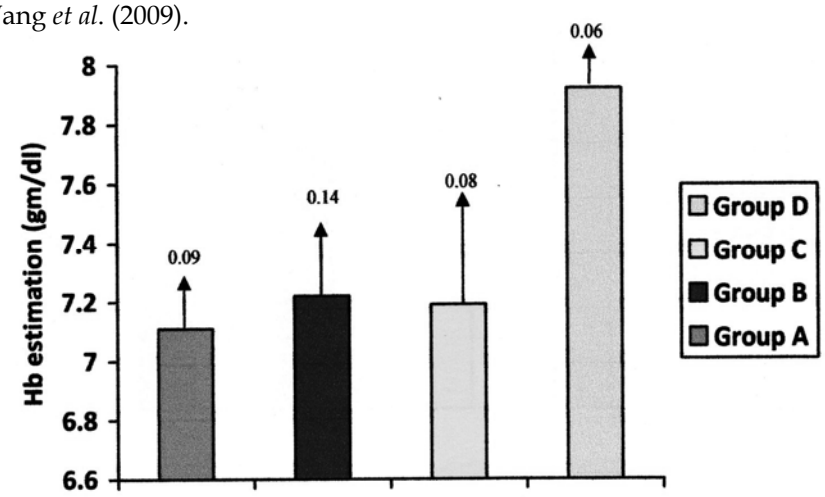

Fig. 3. Effect of enzyme and vitamin AD_3E on the hemoglobin level (gm%) in broilers (mean ± SE)

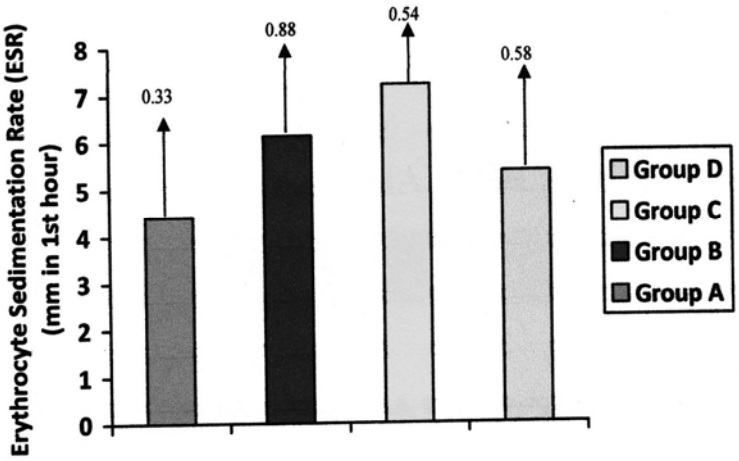

Fig. 4. Effect of enzyme and vitamin AD_3E on the ESR (mm in 1st hour) in broilers

TEC, Hb and ESR values were significantly increased in treated groups than the control group. The reasons of these changes may be due to enhancement of metabolism and absorption.

REFERENCES

Cetin, N., Guclu, B. K. and Cetin, E. 2005. The effects of probiotic and enzyme on some hematological and immunological parameters in turkeys. *Journal of Veterinary Medicine*. 52(6): 263-267.

Cowieson, A. J. and Ravindran, V. 2006. Effect of exogenous enzymes in maize based diets varying in nutrient density for young broilers: growth performance and digestibility of energy, minerals and amino acids. *British Poultry Science*. 49(1): 37-44.

Hill, F. W., Scott, M. L., Norris, L. C. and Henser, G. F. 1961. Reinvestigation of the vitamin A and D requirements of laying and breeding hens and their progeny. *Poultry Science*. 40: 1245-1247.

McDowell, L. R. 1989. Vitamin supplementations is a critical part of good animal nitrition. *Poultry Abs*. 15(4): 97.

Meng, X., Slominski, B. A., Nyachoti, C. M., Campbell, L. D. and Guenter, W. 2005. Degradation of cell wall polysaccharides by combinations of carbohydrase enzymes and their effect on nutrient utilization and broiler chicken performance. *Poultry Science*. 84(1): 37-47.

Raha, S. K. 2009. *Export Possibility of Broiler from Bangladesh*. Economic Affairs Year: 2009, Volume: 54, Issue: 3&4 Print ISSN: 0424-2513.

Wang, F., Wang, B., Zhang, C. S., Zhang, Y., Gao, L. Q. and Wang, W. K. 2009. Effects of different dietary copper and vitamin A levels and their interaction on growth performance and blood physico-paramters in broilers. *Chinese J. Anim. Nutr.*, 21(2): 152-159.

Wang, L. R., Qiao, S. Y., Lu, W. Q. and Li, D. F. 2005. Effects of enzyme supplementation on performance, nutrient digestibility of broilers fed wheat-based diets. *Poultry Science*, 84(6): 875-81.