**International Journal of Research in Engineering and Applied Sciences (IJREAS)**
Available online at http://euroasiapub.org/journals.php
Vol. 6 Issue 11, November - 2016, pp. 211~217
ISSN (O): 2249-3905, ISSN(P) : 2349-6525 | Impact Factor: 6.573 | Thomson Reuters ID: L-5236-2015

# EFFECT OF GRADED LEVELS OF *YEBATON* ON THE PERFORMANCE AND IMMUNE RESPONSES IN COMMERCIAL BROILER BIRDS

**KRISHNA DAIDA[1],**
Department of Poultry Science, College of Veterinary Science,
Korutla, Jagityal Dist-505326, Telangana, India.

**SAHITYARANI M[2],**
Department of Livestock Products Technology, College of Veterinary Science,
Korutla, Jagityal Dist-505326, Telangana, India.

**BABU SUDHAKAR[3]**
Poultry Consultant,
Mumbai, India.

**RAGHUNANDHAN T[4].**
Associate Dean, College of Veterinary Science,
Korutla, Jagityal Dist-505326, Telangana, India.
*1.*

## ABSTRACT

A growth trial was conducted to study the effects of graded levels of *yebaton* (0, 50, and 100 g/ton) on the performance traits, slaughter variables and immune response of commercial broiler *(Vencobb)* birds from 0 to 42 days of age. A total 150 birds were allotted randomly to 30 battery brooder cells and fed with T1 (control diet, *yebaton* was not supplemented to the diet), T2 (50 g/ton of *yebaton*) and T3 (100 g/ton *yebaton*) diets. The birds are reared under uniform managemental conditions and each diet was fed *adlibitum* to 10 replicates consisting of 5 birds per replicate. The stastical analysis of the data revealed no significant (P>0.05) difference in body weight gain, feed consumption and feed conversion ratio among the birds fed experimental diets. However, the slaughter parameters like relative weights of ready to cooked yield (74.46%), breast weight(18.98%), were found to be higher in T3 based diet group. The immune organs weight, spleen (0.289%), bursal yield (0.249%), intestinal length (10.37 cm/100g) and caecal length (1.59cm/100g) were also observed to be higher in T3 based diet group compared to T1 and T2 based dietary groups. The supplementation of *Yebaton* did not influence the antibody production of ND vaccination.

**Key words:** Broiler birds, Immune response, Performance traits, slaughter variables and Yebaton.

## Introduction

Commercial poultry breeding programmes have been imposing high selection pressure for achieving rapid genetic gain per unit time at the earliest possible ages. Today, the broiler chickens weigh around 2.0 to 2.2 kg at 42 days of age. The magnitude of the growth indicates that each day in the life of broiler chicken is important to achieve the targeted body weight. Considering the high magnitude of growth, there has been considerable research directing towards defining the minimum intake of dietary protein and amino acids to reduce the nitrogen in the excreta, thus reducing the nitrogen loss to the environment (Aletor et al., 2000; Plumstead et al., 2007; Waguespack et al., 2009). *Yebaton*, a bio-activity gene drug for immune-regulation and anti-virus. It is a most advanced technology based Peptide Nuclic Acid (PNA) drug, used for anti-virus and immune-regulation. Clinical research demonstrated that *Yebaton* has a specific anti-virus function within species and play a positive role in terms of modulation of host immune system.

## Methodology

Day old, commercial broiler chicks (150) were wing banded and randomly distributed into 30 raised-floored stainless steel battery brooder pens with 5 birds per pen. The brooder temperature was maintained at 34 $\pm$ 1$^0$C up to 7 days of age and gradually reduced to 26 $\pm$ 1$^0$C by 21 days of age. Uniform management and vaccination schedules were followed for all the birds.

Maize-soyabean meal based diets were *isonitrogenous* and *isocaloric* prepared to contain 2900 and 2960 kcal ME/kg during the starter (1-21 days) and finisher (22-42 days) phases, with respective crude protien content of 22 and 19.36%. Diets were supplemented with *Yebaton* (Water soluble Nano-lyophilized Granular) to provide two graded concentration of the *Yebaton* (50 and 100g/ton). The ingredient composition (%) of starter broiler diets (1-21days) and finisher diet (22-42days) with supplementation of *yebaton* at graded levels was shown in Table 1 and **n**utrient composition of starter broiler diets (1-21days) and finisher diet (22-42 days) with supplementatation of *yebaton* at graded levels was shown in Table 2. Each diet was allotted at random to ten replicates of three treatments and fed *adlibitum* from 1 to 42 days of age.

Table: 1 Ingredient Composition (%) of starter broiler diets (1-21days) and finisher diet (22-42days) with supplementation of *yebaton* at graded levels

| **Ingredients** | **Test diet (Starter) in kgs** | | | **Test diets (Finisher) in kgs** | | |
|---|---|---|---|---|---|---|
| **Levels (%)** | **T1** | **T2** | **T3** | **T1** | **T2** | **T3** |
| **Maize** | 61.27 | 61.27 | 61.27 | 68 | 68 | 68 |
| **Soybean meal** | 34.6 | 34.6 | 34.6 | 28 | 28 | 28 |
| ***Yebaton*** | 0 | 0.05 | 0.10 | 0 | 0.05 | 0.10 |
| **Shell grit** | 1 | 1 | 1 | 1.45 | 1.45 | 1.45 |
| **Di- calcium phosphate** | 2.2 | 2.2 | 2.2 | 1.65 | 1.65 | 1.65 |
| **Salt** | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **DL-Methionine** | 0.17 | 0.17 | 0.17 | - | - | - |
| **Lysine** | - | - | - | 0.11 | 0.11 | 0.11 |
| ***Trace Mineral Mixt.** | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 |
| ***Vitamin $AB_2D_3K$** | 0.015 | 0.015 | 0.015 | 0.02 | 0.02 | 0.02 |
| ***Vitamin B complex** | 0.015 | 0.015 | 0.015 | 0.025 | 0.025 | 0.025 |
| **Coccidiostat** | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| **Antibiotic** | 0.05 | - | - | 0.05 | - | - |
| **Choline chloride 50%** | 0.06 | 0.06 | 0.06 | 0.1 | 0.1 | 0.1 |
| **Toxin binder** | 0.15 | 0.15 | 0.10 | 0.1 | 0.1 | 0.05 |
| **Tylosine** | - | - | - | 0.025 | 0.025 | 0.025 |
| **Total** | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |

* Provided (mg/kg diet): thiamin 1; pyridoxine, 2; cyanocobalamine, 0.01; niacin,15; pantothenic acid 10; α tocopherol, 10; riboflavin, 10; biotin, 0.08; menadione, 2; retinol acetate, 2.75; cholecalciferol. 0.03; choline, 650; copper, 8; iron, 45; manganese, 80; zinc, 60; selenium, 0.18.

Table: 2 Nutrient Composition of starter broiler diets (1-21days) and finisher diet (22-42 days) with supplementatation of *yebaton* at graded levels

| **Nutrient** | **Starter diet (0-21 days)** | | | **Finisher diet (22-42days)** | | |
|---|---|---|---|---|---|---|
| **Levels (%)** | **T1** | **T2** | **T3** | **T1** | **T2** | **T3** |
| **Metabolizable energy (kcal/kg)** | 2900 | 2900 | 2900 | 2960 | 2960 | 2960 |
| **Crude protein (%)** | 22 | 22 | 22 | 19.36 | 19.36 | 19.36 |
| **Ether extract (%)** | 2.61 | 2.61 | 2.61 | 2.81 | 2.81 | 2.81 |
| **Crude fibre (%)** | 3.42 | 3.42 | 3.42 | 3.18 | 3.18 | 3.18 |
| **Calcium (%)** | 1 | 1 | 1 | 1.01 | 1.01 | 1.01 |
| **Available phosphorus (%)** | 0.5 | 0.5 | 0.5 | 0.40 | 0.40 | 0.40 |
| **Lysine (%)** | 1 | 1 | 1 | 1.03 | 1.03 | 1.03 |
| **Methionine (%)** | 0.5 | 0.5 | 0.5 | 0.30 | 0.30 | 0.30 |
| **Total Sulphur Amino Acids (%)** | 0.83 | 0.83 | 0.83 | 0.61 | 0.61 | 0.61 |

Individual body weights and feed intake of replicates were recorded at weekly intervals and the feed conversion ratio was calculated as the ratio of feed consumed and weight gained. One bird representing the mean body weight of each replicate (ten birds per treatment) was selected and sacrificed by cervical dislocation on 43rd day of age. The data on weight of edible carcass, liver, gizzard, abdominal fat, breast meat, spleen and bursa were recorded and all the data was expressed as percentage of the pre-slaughter weight of the same bird. The blood serum was collected from the brachial vein of eight birds from each dietary group on the 42nd day and subsequently, micro-haemagglutination activity of serum was estimated and the antibody titres ($log_2$) were measured following the standard procedure (Wegmann and Smithies, 1966).

## Statistical analysis

Data was subjected to statistical analysis under completely randomized design employing one-way analysis of variance (Snedecor and Cochran, 1989). The means of different treatments were compared with Duncan's multiple range tests (Duncan, 1955). Significance was considered at $P < 0.05$ levels.

## Results

### Dietary treatment effect on body weight gain

The data on live body weight gain of broiler chickens fed experimental diets from 0-6 weeks of age was presented in Tables 3 to 5 respectively. No significant difference was observed in the body weight gain of the birds fed various experimental diets throughout their growth period. The higher body weights were found in T3 (100g *yebaton*/ton) based diet group-137.9g, 359.7 g, 695.2 g 1622.0 g during 1st, 2nd,3rd and 5weeks of age respectively followed by T2 based diet group. At 6 weeks of age, the body weight of the birds fed control diet (T1) was found to be higher, compared to other diets.

### Dietary treatment effect on cumulative feed consumption

The weekly feed consumption of broilers (g/b) fed experimental diets from first to six weeks of age was shown in Tables 3 to 5 respectively. The cumulative feed consumption was not influenced significantly ($P>0.05$), among dietary groups. During 1st and 2nd week of the trial, the birds consumed more of T1 based diets compared to T2 and T3 based diets. Then after (3-6 weeks) high feed consumption was found in T2 based diets (50g *yebaton*/ton of feed) compared to other diets.

### Feed conversion ratio

The feed conversion ratios (FCR) from 1-6 weeks (weekly interval) were presented in Tables 3 to 5 respectively. The FCR was found to be higher in control diet group (1.213) during first week of age, followed by 1.418, 1.509, 1.701, 2.282 in T2 based dietary group during 2nd, 3rd, 4th and 5th week of age. At 6 weeks of age higher FCR (2.613) was observed in the birds fed T3 based diet. No significant difference was observed in FCR of birds fed various experimental diets.

Table: 3 Effect of dietary inclusion of *Yebaton* at graded levels on Body weight gain (g), cumulative feed consumption (g/bird) and feed conversion ratio of broiler chicken during first two weeks of age

| **Diets** | **1 Week** | | | **2 Week** | | |
|---|---|---|---|---|---|---|
| | **B.wt** | **FC** | **FCR** | **B.wt** | **FC** | **FCR** |
| **T1** | 140.6 | 170.3 | 1.213 | 344.9 | 479.7 | 1.393 |
| **T2** | 140.4 | 168.4 | 1.200 | 330.0 | 467.3 | 1.418 |
| **T3** | 137.9 | 164.9 | 1.199 | 359.7 | 476.2 | 1.326 |
| **SEM** | 2.619 | 2.752 | 0.0095 | 5.610 | 4.388 | 0.014 |
| **P-Value** | 0.905 | 0.739 | 0.829 | 0.09 | 0.523 | 0.007 |

Means bearing one common superscripts in a column do not differ significantly (P<0.05).

Table: 4 Effect of dietary inclusion of *Yebaton* at graded levels on Body weight gain (g), cumulative feed consumption (g/bird) and feed conversion ratio of broiler chicken during third and fourth weeks of age

| **Diets** | **3 Week** | | | **4 Week** | | |
|---|---|---|---|---|---|---|
| | **B.wt** | **FC** | **FCR** | **B.wt** | **FC** | **FCR** |
| **T1** | 688.9 | 993.7 | 1.444 | 1018.2 | 1712.5 | 1.685 |
| **T2** | 671.7 | 1012.0 | 1.509 | 1099.2 | 1868.2 | 1.701 |
| **T3** | 695.2 | 974.9 | 1.407 | 1071.3 | 1706.2 | 1.594 |
| **SEM** | 12.189 | 12.328 | 0.0155 | 19.609 | 31.3433 | 0.0147 |
| **P-Value** | 0.742 | 0.498 | 0.012 | 0.241 | 0.046 | 0.001 |

Means bearing atleast one common superscripts in a column do not differ significantly (P<0.05).

Table: 5 Effect of dietary inclusion of *Yebaton* at graded levels on Body weight gain (g), cumulative feed consumption (g/bird) and feed conversion ratio of broiler chicken during fifth and sixth weeks of age

| **Diets** | **5 Week** | | | **6 Week** | | |
|---|---|---|---|---|---|---|
| | **B.wt** | **FC** | **FCR** | **B.wt** | **FC** | **FCR** |
| **T1** | 1589.3 | 3157.5 | 1.985 | 1921.2 | 4789.5 | 2.495 |
| **T2** | 1580.8 | 3602.8 | 2.282 | 1897.2 | 4808.8 | 2.531 |
| **T3** | 1622.0 | 3492.7 | 2.150 | 1823.7 | 4779.7 | 2.613 |
| **SEM** | 17.4258 | 80.1258 | 0.04128 | 39.0297 | 132.95 | 0.0393 |
| **P-Value** | 0.623 | 0.050 | 0.005 | 0.597 | 0.996 | 0.480 |

Means bearing atleast one common superscripts in a column do not differ significantly (P<0.05).

### Dietary treatment effect on carcass yields

The carcass characteristics *viz*., ready to cook yield (RTC), percent weight of liver, giblet abdominal fat, intestinal and caecal length of broiler chickens fed different experimental diets was shown in Table 6. The RTC yield g/kg varied between 726.5 to 754.7 g/kg and found to be highest in T3 based diet group (754.7). The breast yield was higher in T3 based diet group (198.3g). The weight of abdominal fat varied between 11.0 to 11.7g/kg in groups fed various diets.

**Dietary treatment effect on immune competence**

The weight of lymphoid organs such as spleen and bursa at 6 weeks of age was presented in Table 6. The percent weight of spleen and bursa were comparable among all the dietary groups at six weeks of age. However, the spleen and bursal weight were found to be higher (0.289g/100g and 0.249g/100g respectively) in birds fed T3 based experimental diet(100g *yebaton*/ton). The *Yebaton* supplementation at 50 and 100g/ton feed, did not influence the antibody production of ND vaccination.

Table: 6 Effect of dietary inclusion of *Yebaton* at graded levels on carcass variables, organ weights (% carcass) and immune organs weight in broiler chicken at 42days of age

| Diets | RTC | Breast | Liver | Abdominal fat | Spleen | Bursa (g/100 g) | Giblet | Intestinal Length (cm/100g B.wt) | Caecal length (cm/100g B.wt) |
|---|---|---|---|---|---|---|---|---|---|
| **T1** | 72.65 | 19.54 | 2.25 | 1.16 | 0.253 | 0.183 | 4.65 | 10.37 | 1.67 |
| **T2** | 74.46 | 18.98 | 2.44 | 1.10 | 0.244 | 0.205 | 4.85 | 10.27 | 1.56 |
| **T3** | 75.47 | 19.83 | 2.33 | 1.17 | 0.289 | 0.249 | 4.83 | 10.49 | 1.59 |
| **SEM** | 8.767 | 2.680 | 0.7461 | 0.800 | 0.189 | 0.192 | 1.186 | 2.002 | 0.380 |
| **P-Value** | 0.453 | 0.468 | 0.616 | 0.945 | 0.636 | 0.394 | 0.778 | 0.918 | 0.531 |

Means bearing atleast one common superscripts in a column do not differ significantly (P<0.05).

## Discussion

The present experiment was conducted to study the effects of graded levels of *yebaton* (0, 50, and 100 g/ton) on the performance, slaughter variables and immune response of commercial broiler *(Vencobb)* birds. The results obtained were statistically similar, no significant difference was observed in the growth performance of bird fed various experimental diets, which was similar to Abu et al., 2009, who found no significant (P > 0.05) effect on average daily feed intake and feed conversion efficiency of the birds fed a commercial multi-enzyme complex (Avizyme 1500TM) . Where as a slight improvement in performance traits was observed in broilers fed the *yebaton* compared with control birds, which was similar to the results obtained by Awad et al., (2008) who also found improved performance traits in broilers fed the probiotic compared with control birds. The data pertaining to the carcass characteristics of the birds various levels of *yebaton* did not differed significantly. Similarly, Midilli et al., 2008 also found that dietary probiotic and/or prebiotic supplementation did not significantly affect body weight, body weight gain, feed intake, carcass weight, carcass yield. However, the breast yield was higher in T3 (100g *yebaton*/ton) based diet group which was on par with Kabir et al., 2004, who found that addition of probiotics to the diet, increased the breast yield. The results obtained in the experiment pertaining to the immune organs such as bursal weight is contrary to that of Islam *et al,* 2004 who found significantly differed bursa weight among the broiler chicken fed diets supplemented with probiotics at varied levels. The supplementation of Yebaton at different levels did not influence antibody production to Newcastle disease virus significantly which was in contrast to

Haghighi et al., 2005, who reported that probiotic-treated birds had significantly more serum antibody than the birds that were not treated with probiotics.

## References

*Abu.O.A., Igwebuike.J.U., and Abu.J, 2009,* Performance of broiler chickens fed diets supplemented with feed grade enzyme, African Journal of Livestock Extension, vol 7.

Aletor.V.A., Hamid.I.I.,Neib.E., and Pfeffer.E, 2000, Low-protein amino acid supplemented diets in broiler chickens: effects on performance, carcass characteristics, whole body composition and efficiency of nutrient utilization, Journal of Science, Food and Agriculture 80:547-554.

Awad.W.A., Ghareeb.K., Abdel Raheem.S, and Bohm.J, 2008, Effects of dietary inclusion of probiotic and synbiotic on growth performance, organ weights, and intestinal histomorphology of broiler chickens, Oxford journal of poultry science.

Haghighi.H.R., Gong.J., Gyles.C.L., Hayes.M.A.,Sanei.B., Parvizi.P., Gisavi.H., Huang.M.K., Choi.Y.J., Hude.R., Lee.J.W., Lee.B., and Zhao.V, 2004, Poultry Sci., 83: 788-795.

Islam.M.W., Rahman.M.M., Kabir.M.L., Kamruzzaman.S.M., and Islam.M.N, 2004, Effects of probiotics supplementation on growth performance and certain haemato-Biochemical Parameters in Broiler chickens, Bangl. J. Vet. Med., 2 (1):39-43.

Kabir.S.M.L., Rahman.M.B., Rahman.M.M., and Ahmed.S.U, 2004, The dynamics of probiotics on growth performance and immune response in broilers. Int. Jornal of poultry science 3:316-364.
Midilli.M., Alp.M., Kocabagli.N., Muglali.O.H., Turan.N., Yılmaz.H., and Çakir.S, 2008, Effects of dietary probiotic and prebiotic supplementation on growth performance and serum IgG concentration of broilers, S. Afr. j. anim. sci. vol.38 n.1 Pretoria.
National Research Council (NRC), 1994. Nutrient requirements for poultry, 9th revised ed. National Academy Press, Washington, D.C.

Plumstead., Peter William., Brake.J.T., and Spears.J.W, 2007, Strategies To Reduce Fecal Phosphorus Excretion In The Broiler Industry Without Affecting Performance. Ph. D thesis submitted to the Graduate Faculty of North Carolina State University.

G.W.Snedecor and W.G.Cochran., (1989),Statistical Methods. 8th Ed. Ames: Iowa State Press.

Waguspeak.A.M., Powell.S., Bidner.T.D., Payne.R.L., and Southern.L.L, 2009, Effect of incremental levels of L-lysine and determination of the limiting amino acids in low crude protein corn-soybean meal diets for broilers, Poult. Sci. 88:1216-1226

Wegmann.T.G., and Smithies.O, 1966. Transfusion, 6: 67-73