

Effect of different levels of exogenous enzyme supplementation to the diet on broiler performances

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An exogenous enzyme containing purified xylanase, amylase, and protease was used in the diet to improve the efficiency of broiler production. Enzyme supplementation improved broiler performance including live weight gain, feed consumption, feed conversion ratio (FCR) and livability (Alam *et al.* 2003, Rahman *et al.* 2005). Burrows *et al.* (2002) reported positive responses to the addition of enzyme in terms of improvements in FCR, body weight, uniformity and nutrient digestibility in broiler birds. However, little work has been done to optimize the enzyme level in broiler ration. Therefore, the present piece of work was undertaken with a view to optimize the level of enzyme supplementation to broiler ration.

Hubbard Classic broiler strain was selected to conduct the feeding trial and day-old chicks were collected from a reputed hatchery and introduced into the experimental pens under different feeding treatments. The 42-day long feeding trial was carried out. The house for experimental birds was divided into 12 equal pens by using wire-net and bamboo materials. The birds were assigned at random to 4 dietary treatments. The control group (T₀) received no enzyme while the treatment groups T₁, T₂ and T₃ received the similar diet of control group with the supplementation of an exogenous enzyme at the rate of 30 g, 50 g and 70 g/100 kg diet, respectively. Supplemented enzyme is composed of xylanase, *Trichoderma longibrachiatum* (600 units/g), protease, *Bacillus subtilis* (8 000 units/g) and amylase *Bacillus amyloliquofaciens* (800 units/g). Metabolizable energy (MJ/kg), crude protein (%) and crude fibre (%) contents of the diets were 13.30, 21.55 and 4.90 for starter (day old to 21d) and 13.50, 21.16, 5.0 for finisher ration (22 to 42 d), respectively. Feed was supplied *ad lib.* to the birds throughout the rearing period. The chicks were procured from disease

free hatchery and, free entrance for visitors was prohibited and was restricted to researchers and labors. The birds were vaccinated against infectious bronchitis, Newcastle and Gamboro diseases according to the recommendations of the vaccine manufacturers. Feed conversion ratio (FCR) was calculated by dividing the quantity of feed consumed by live weight attained. Mortality of broilers was recorded replication-wise and their survivability was calculated. The net profit was calculated by deducting the production costs from market price of live broiler at 42 days of age. Feed samples were analyzed following the method of AOAC (AOAC 1990). Data were analyzed for ANOVA using a completely randomized design (CRD) with the help of statistical package program (SPSS 1999) in computer.

The result revealed that the enzyme levels had significant effect ($P < 0.001$) on live weight at the age of 42 days (marketing age). Highest live weight at marketing age was

Table 1. Live weight gain, feed consumption and feed conversion ratio of broiler groups fed diets supplemented different levels of enzyme

Treatments	Live weight at 42d (g/bird)	Total feed consumption (up to 42 days of old, kg/bird)	Feed conversion ratio (FCR)
T ₀ (No enzyme)	2270.00 ^b ±5.77	4.79±0.21	2.14 ^b ±0.19
T ₁ (30 g enzyme/ 100 kg feed)	2306.67 ^b ±23.33	4.42±0.17	1.92 ^b ±0.69
T ₂ (50 g enzyme/ 100 kg feed)	2403.33 ^a ±8.82	4.35±1.87	1.74 ^a ±0.28
T ₃ (70 g enzyme/ 100 kg feed)	2290.00 ^b ±11.55	4.44±0.18	1.94 ^b ±0.69
Over all mean	2317.50±16.57	4.50±0.68	1.93±0.30
F-value	17.47	1.45	5.01
Level of significance	***	NS	*

NS, Nonsignificant ($P > 0.05$); *, significant ($P < 0.05$); ***, significant ($P < 0.01$); ^{a,b}, means with uncommon superscripts for each trait differ significantly ($P < 0.05$).

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Table 2. Mortality rate and net profit of broiler groups fed diets supplemented with different levels of enzyme

Treatments	Mortality rate (%)	Net profit (Taka [#] /kg live broiler)
T ₀ (No enzyme)	23.33±3.33	11.71 ^b ±2.80
T ₁ (30 g enzyme/100 kg feed)	13.33±3.33	17.52 ^b ±1.72
T ₂ (50 g enzyme/100 kg feed)	10.00±0.00	22.07 ^a ±0.35
T ₃ (70 g enzyme/100 kg feed)	13.33±3.33	16.87 ^b ±2.59
Over all mean	15.00±1.95	17.04±1.43
F-value	4.00	4.07
Level of significance	NS (P<0.06)	*

NS, Nonsignificant (P>0.05), *significant (P<0.05), ^{a, b}, means with uncommon superscripts for each trait differ significantly (P<0.05), [#]1 US\$ Taka 70.0 (approximately).

observed in broiler group fed diet supplemented with 50 g enzyme per 100 kg feed followed by 30 g, 70 g and 0 g enzyme, respectively (Table 1). On the other hand, nonsignificant effect of enzyme supplementation on mortality rate in the study is in agreement with the findings of Alam *et al.* (2003) and Rahman *et al.* (2005). Feed conversion ratio was lowest in broiler group fed diet supplemented enzyme @ 50 g/100 kg feed and the effect of levels of enzyme on this parameter was significant (P<0.05). The effect of enzyme levels on mortality rate was not significant (Table 2). Nonsignificant effect of enzyme supplementation on mortality rate in the study is in agreement with the findings of Alam *et al.* (2003) and Rahman *et al.* (2005). Net profit per kg live bird was highest (20.53 BD Taka, 1 US\$ = BD Taka 70.0 approximately) in broiler group fed diet supplemented with 50 g enzyme per 100 kg feed followed by 30 g, 70 g and 0 g per 100 kg feed, respectively (Table 2).

In the present study, live weight at marketing (42 days of age), feed conversion ratio and net profit (Taka/kg live bird) were significantly better in broiler group fed diet supplemented with enzyme @ 50 g /100 kg. Therefore, it

may be concluded that the enzyme supplementation at 50 g/100 kg broiler feed is optimum for the traits under study.

SUMMARY

A feeding trial of 42 days was conducted to find out suitable supplementation rate of a particular enzyme in the diet of broilers. The birds were assigned at random to 4 dietary treatments having 3 replications of 10 birds in each. An exogenous enzyme containing purified xylanase, amylase, and protease was supplemented @ 0 g, 30 g, 50 g and 70 g/100 kg diet under 4 dietary treatments, T₀, T₁, T₂ and T₃, respectively. The effect of different levels of enzyme was significant for marketing live weight (42 days), feed conversion ratio and net profit. However, the effect of enzyme levels was not significant for mortality percentage and average feed consumption per bird. The mean values indicated that all the parameters under study were performed better in broiler group fed diet supplemented with 50 g enzyme/100 kg. Therefore, it may be concluded that enzyme supplementation @ 50 g/100 kg feed may be suitable in the diet of broiler.

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