

EFFECT OF EXOGENOUS GLUCANASE SUPPLEMENTATION IN FEED ON TURKEY POULT PERFORMANCE

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ABSTRACT

Biological experiment was conducted to find out the effect of exogenous glucanase enzyme at three different levels of 12.5 BG U/Kg, 25 BG U/Kg and 50 BG U/Kg of feed along with control in turkey pre brooder and brooder rations. Sixty four straight run Beltsville Small White turkey poults were randomly allotted to different treatment groups with two replicates of eight poults each. Isocaloric and isonitrogenous levels were maintained in all the experimental rations. Standard management conditions were provided up to eight weeks of age. Performance of turkey poults was evaluated based on the biweekly bodyweight, feed consumption and livability. The inclusion of glucanase enzyme resulted in highly significant ($P=0.01$) improvement in the eighth week body weight in turkey poults. The eighth week body weight was highest at 50 BG U/Kg feed followed by other groups according to the concentration of enzyme in feed. However no significant differences were seen in feed efficiency and livability.

Key words: enzymes, feed efficiency, growth, turkeys

The cell wall of cereal grains, legumes and oilseed meals contain non-starch polysaccharides (NSP) like cellulose, hemicellulose, pectins, β -glucans, α -galactosides (raffinose, stachyose and verbacose) and pentosans. These NSPs exhibit anti-nutritional activities by interfering with the nutrient accessibility, with a consequent negative effect on the performance.

Exogenous enzymes are added to poultry diets to manipulate conditions in the digestive tract and improve the nutrient value of feed stuffs (Classen, 1996; Meng *et al.*, 2005). Digestive

enzyme activities (units/kg of BW) measured in pancreas and intestinal contents increase with age (Nitsan *et al.*, 1991). Rate of development of secretion of digestive enzymes in the post-hatched chicks could also be a limiting factor in digestion (Krogdahl and Sell, 1989; Noy and Sklan, 1995; Sklan 2001), leading to inefficient growth in birds, poor feed conversion ratios and poor livability. The exogenous enzyme supplementation in young chicks may promote digestion and utilization of diets.

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Microbial enzyme preparations such as xylanase, α -glucans, cellulase, α -amylase, protease and phytase are found to circumvent the adverse effects of NSP in the diet and increase the performance of animals (Lazaro *et al.*, 2003; Mathlouthi *et al.*, 2003). In most of the countries, poultry feed is based primarily on corn and soyabean meal, which supplies major part of energy and protein in the diet. It has been studied that the glucanase improved the energy value of both corn and soyabean meal at all ages in broilers (Leslie *et al.*, 2007).

Glucanase cannot be synthesized by the birds and it digests high molecular weight α -glucans in grain- and cereal-based feeds. Hence it can be used to digest endosperm cell walls which contain about 70% α -glucans. Research on influence of exogenous enzymes on the performance of turkey appears to be scanty. Therefore, the objective of this study is to find out the effect of glucanase supplementation in diet on eighth week performance of Beltsville Small White poult.

The study was conducted with Beltsville Small White turkey poult raised in single tier brooder cages, with each cage as a replicate. Sixty four straight run day old poult were wing banded and randomly allotted to control and three treatment groups with two replicates of eight poult each.

Glucanase enzyme was procured from Biocon Limited, Bangalore. This enzyme is a thermostable fungal α -glucanase enzyme, which has both α -1-3 and α -1-4 endo-glucanase activities. Glucanase enzyme having an activity of 500 BG units/g was incorporated in the turkey pre-brooder and brooder rations at three different levels of 12.5 BG U/Kg, 25 BG U/Kg and 50 BG U/Kg of feed along with control. The prebrooder and the brooder rations were formulated to meet requirements of turkey poult. The rations were supplemented with commercial vitamin preparations. Standard management conditions were followed for all the treatments and replicates. Performance of turkey poult was evaluated based on the biweekly body

weight, feed consumption and livability.

The mean and the standard error were calculated by completely randomized design as per the methods of Snedecor and Cochran (1994).

The influence of glucanase inclusion in feed was highly significant ($P=0.01$) on eighth week performance (Table 1). The eighth week body weight was better at 50 BG U/Kg feed followed by other groups according to the decreasing concentrations of enzyme in feed (Fig 1). This result is in accordance with the report that the body weight gain of broilers, fed diets containing different combinations of carbohydrases with glucanase, was greater ($P=0.05$) with improved ($P=0.05$) ileal digestibilities of starch and protein than that of birds fed control diet (Meng *et al.*, 2005).

There was no significant difference in feed and livability among the different treatment study. It has been reported that feed was not affected ($P=0.05$) by diet supplementation in broilers (Meng *et al.*, 2006). Feed gain was not affected by addition in broiler chicks two weeks post hatch (Meng *et al.*, 2006).

In conclusion, the present study indicates that the supplementation of glucanase enzyme to turkey poult from 0 to 8 weeks of age would improve their growth performance. It is beneficial to use glucanase enzyme in poult feed.

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Table 1 - Influence of Glucanase on growth performance in Beltsville small white poulters

Treatments	Body Weight mean (g) (\pm SE)						Feed efficiency ^{NS}	Livability (%) ^{NS}
	2 nd week*	4 th week*	6 th week ^{NS}	8 th week				
				Male*	Female ^{NS}	Pooled**		
Control	126.25 ^b \pm 1.71	313.42 ^b \pm 9.12	627.67 \pm 11.83	1108.50 ^b \pm 17.80	939.33 \pm 14.66	1013.84 ^b \pm 12.98	2.72	93.75
12.5 BG u/Kg	135.64 ^{ab} \pm 2.74	336.48 ^{ab} \pm 5.25	629.97 \pm 11.99	1161.14 ^{ab} \pm 23.54	944.75 \pm 13.47	1053.80 ^{ab} \pm 13.18	2.68	87.50
25 BG u/Kg	139.08 ^a \pm 2.95	350.72 ^a \pm 7.27	668.28 \pm 22.26	1192.86 ^a \pm 24.12	962.56 \pm 32.60	1075.86 ^a \pm 20.85	2.57	100.00
50 BG u/Kg	133.43 ^{ab} \pm 4.55	334.22 ^{ab} \pm 12.58	661.25 \pm 16.34	1207.00 ^a \pm 25.13	996.75 \pm 16.44	1102.41 ^a \pm 15.51	2.64	87.50

* Means bearing different superscript within the column differ significantly (P=0.05)

** Means bearing different superscript within the column differ significantly (P=0.01)

NS – Not significant

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