A NOTE ON EFFECT OF PROTEASE SUPPLEMENTATION IN NUTRITIONALLY MARGINAL LOW PROTEIN DIET ON TURKEY POULT PERFORMANCE*

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ABSTRACT
A biological trial was conducted to study the effect of protease supplementation exogenously in low protein diet (@ 40 lakhs hemoglobin unit on a tyrosine basis / tonne), utilizing 36 day old Beltsville small white turkey poults, between 0-8 weeks of age. Out of them 18 poults were given diet without protease and the other 18 with protease supplementation (2 replications of 9 poults each). The diet, formulated with maize, soyabean meal and fish meal to contain 22% crude protein and 2600 KCal/Kg metabolizable energy, was given up to 8 weeks of age. The performance of poults up to 8 weeks of age was assessed by bi-weekly body weight, feed efficiency and livability. Although there was numerical improvement in body weight and feed efficiency in protease supplemented group, it was statistically not significant. It is concluded that in nutritionally marginal low protein diet, supplementation of protease was not effective in improving the brooder performance of the turkey poults.

Key Words: turkey poults, brooder, performance, low protein diet, protease supplementation

INTRODUCTION
Immediately post hatch, birds have low endogenous enzyme production (Noy and Sklan, 1995). Enzymatic digestion is initiated by pepsin and further aided by pancreatic proteases, peptidases, lipase and amylase (Troche, 2005). In fed birds, pancreatic and biliary outputs were nearly complete by 7 days of age (Noy and Sklan, 1997). This is due to the fact that increased feed intake and decreased transit times, allowed for more efficient digestion of sugars and lipids. However, nitrogen digestion appeared to develop less rapidly and was only at 80% by day 7 (Noy and Sklan, 1995). Thus low rates of nitrogen digestion result in insufficient proteolysis thereby making protein as the rate-limiting nutrient in early digestion.

A wide range of endogenous proteases are synthesized and released in the gastrointestinal tract of the bird, and these are generally considered sufficient to optimize feed protein utilization (Nir et al., 1993; Le Huerou-Luron et al., 1993). However, based on protein digestibility values reported in the

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It appears that valuable amounts of protein pass through the gastrointestinal tract without being completely digested (Lemme et al., 2004).

Along with increasing feed ingredient cost, the growing expectations of reduced environmental pollution from animal agriculture have been fueling interest in the use of enzymes in animal diets. Research on the use of exogenous enzymes in broiler diets has been ongoing for decades; however, commercial use of enzymes is more recent.

Turkey production is rapidly transforming from a backyard activity into a modern, scientific and vibrant farming. Literature on the above subject in turkey is scanty. Keeping this in view, the present study was carried out to study the effect of protease supplementation in low protein diet on the performance of turkey poults.

**MATERIALS AND METHODS**

**Experimental design**

Day old straight run Beltsville small white turkey poults (36 nos.) were randomly divided into two treatments having two replications each with 9 poults per replicate and were reared up to 8 weeks period. Colony cages were utilized for conducting the biological experiment. Each colony cage was identified as one replicate. Feeder space, waterer space, lighting and other management conditions were identical in all treatment groups.

**Supplemental enzyme**

Patent protease enzyme from leading enzyme manufacturer was used for this research work. Freshly indented enzyme was mixed in the experimental diet at recommended level of 40.0 lakhs Hemoglobin Unit on a Tyrosine Basis (HUT units) / tonne of feed. Experimental feeds both control and treatment, were mixed once in fifteen days so as to retain enzyme activity. Enzyme was stored in tight packed container to avoid any oxidative changes.

**Experimental diet**

The experimental diets were prepared based on analysed values of feed ingredients at the Central Feed Technology Unit, Post Graduate Research Institute in Animal Sciences, Kattupakkam, Chennai, India. Experimental diets of the biological trial were iso-caloric and iso-nitrogenous.

Protease (40.0 lakhs HUT units / tonne of feed) was incorporated in a nutritionally marginal diet having 2628 Kcal / Kg of metabolisable energy (M.E.) and crude protein (CP) level of 21.95%, in poults between 0 and 8 weeks of age. The diet was formulated using maize, soyabean meal and fish meal. The experimental poults were fed with measured quantity of feed but *ad libitum*.

**Performance assessment**

Brooding performance of poults (0-8 weeks of age) was assessed based on the biweekly body weight, feed consumption and livability percentage. Feed efficiency was calculated based on the total feed consumption and total body weight gain in respective groups. At 8th week, sex of the bird was identified and noted for sex correction. Dead birds were subjected to necropsy examination to find out the etiology.
Statistical analysis

All the data were subjected to statistical analysis as recommended by Snedecor and Cochran (1994) to arrive at inferences.

RESULTS AND DISCUSSION

Performance of the Beltsville small white turkey poult is presented in Table 2. The analysis of variance of the data is tabulated in Table 3. The bi-weekly body weight, feed efficiency and livability did not show any significant difference due to addition of protease enzyme in diet with 21.95% level crude protein and 2628 KCal/Kg metabolisable energy. Inclusion of protease enzyme only numerically improved 8th week body weight and feed efficiency.

The data indicated that in nutritionally marginal low protein maize, soya and fishmeal diet, supplementation of protease may not be effective in improving the brooder performance of the turkey poult.

REFERENCES


Table 1

Effect of protease supplementation in nutritionally marginal low crude protein (22%) diet on poults performance

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Body weight (g)</th>
<th>Mean ± SE</th>
<th>Feed efficiency (%)</th>
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<tbody>
<tr>
<td></td>
<td>2nd week</td>
<td>4th week</td>
<td>6th week</td>
</tr>
<tr>
<td>Control group</td>
<td>148.94 ± 3.61</td>
<td>384.81 ± 9.81</td>
<td>731.80 ± 17.88</td>
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<tr>
<td>Protease supplemented group</td>
<td>150.83 ± 5.27</td>
<td>400.06 ± 13.07</td>
<td>758.67 ± 23.10</td>
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</tbody>
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