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EFFECT OF PHYZYME - PA ON PHOSPHORUS UTILIZATION IN COLOUR BROILERS FED WITH LOW AVAILABLE PHOSPHORUS DIETS

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Abstract: A study on the influence of Phyzyme – PA on phosphorus utilization in colour broiler chicks was **carried** out by utilizing 300 day old colour broiler chicks for a period of eight **weeks.** The eighth week body weight and tibial ash was significantly higher in enzyme supplemented group (T3) than the unsupplemented group (T2) and was comparable to the standard control. The feed consumption was significantly lower in groups fed with 0.3% available phosphorus diet. The feed efficiency was improved **in** broilers feed with low phosphorus diets supplemented with **Phyzyme–PA.** In the present study, the better utilization of phosphorus in chicks was indicated by significantly ($P \leq 0.01$) higher body weight, tibial ash, superior feed efficiency and reduced phosphorus excretion **in** the chicks fed on Phyzyme – PA supplemented diet. Based on the results obtained from this study, it is inferred that the Phyzyme–PA supplementation improved the utilization of phytate phosphorus by the **colour broilers**.

Keywords: Colour broilers, Phyzyme –PA, phytate phosphorus, tibial ash.

Introduction

The bioavailability of phosphorus from feed ingredients of plant origin commonly used in poultry ration is only about 30 percent (Nelson *et al.,* 1968). Two-third portion of total phosphorus in plant feed stuffs is in the form of phytic acid **which cannot be utilized by the poultry due to lack of endogenous phytase activity in the intestinal mucosa** (Moor and Veum, 1983). Recent studies revealed that phytase can release the orthophosphate group from the phytate molecule (Gibson and Ullah, 1990). Keeping this view an experiment was conducted to determine the effectiveness of **Phyzyme – PA** for improving P utilization in colour broilers fed with low available phosphorus diet.

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Materials and Methods

A total of 300 day-old straight run colour broiler chicks (Varna) purchased from Revolving Fund Hatchery, Centre for Advanced Studies in Poultry Science, Mannuthy was utilized for the experiment. The chicks were wing banded, individually weighed and randomly allocated on the basis of body weight into three treatment groups each with four replicates of 25 chicks **each**. All the experimental chicks were housed in deep litter system under identical conditions. Routine scientific managemental practices were followed.

Each treatment group was fed with one of the following three experimental diets viz., containing 0.5% available phosphorus (AP) (T1), 0.3% AP (T2) and 0.3% AP supplemented with Phyzyme – PA® (contains phytase, protease and amylase) (T3) at the rate of 250 gm per ton of **feed respectively *ad libitum*.** The diets were analyzed for proximate composition, (AOAC, 1990).

Data on body weight and feed consumption were recorded fortnightly. **The weight gain, feed efficiency were calculated.** The droppings were collected from two birds from each replicate using a total collection method for three days described by Summers *et al.* (1976). The droppings were weighed and a sample was taken, oven dried at 70^{O}C for 2 hours and ground prior to phosphorus estimation. At the end of the experiment, two chicks were randomly picked up from each replication of all the dietary groups, sacrificed and left tibia was removed by the method described by Kalango and Ademosun (1973). The fat-free bone ash content of the tibia was estimated (AOAC, 1975). The data were subjected to one way analysis of variance in a **Completely Randomized Design** (Snedecor and Cochran, 1989) and the means in different treatments were tested for statistical significance using Duncan's multiple range test as described by Duncan.

Results and Discussion

Performance of chicks fed with different dietary treatments is given in Table 2. The eight week body weight was significantly ($P \leq 0.01$) higher in enzyme supplemented group (T_3) than the unsupplemented group (T_2) and was comparable to the standard control. Huyghenbaert (1996) reported significant improvement in body weight of broiler chicks fed with diets supplemented with phytase. Total feed intake was significantly ($P \leq 0.01$) different between the dietary groups. It was lower in group (T2) fed with low available phosphorus diets compared to other groups and higher in standard control ($P \leq 0.01$). Denbow *et al.* (1995) found that supplementation of phytase to broiler diets containing 0.27% non phytate phosphorus improved feed intake significantly. It was also observed that feed efficiency was

statistically different among the treatments. **Significantly (P≤0.01) superior feed efficiency was recorded in enzyme supplemented group (T_3)** whereas it was inferior in group fed with 0.3 percent AP without enzyme. Carlos and Edwards (1997) also recorded significantly improved feed efficiency in broilers feed with low phosphorus diets supplemented with phytase. The percent tibial ash content was comparable between enzymes supplemented group and standard control whereas it was **significantly (P≤0.01) lower** in unsupplemented group fed with 0.3 percent AP. Biehl *et al.* (1996) reported increased tibial ash in broilers fed with phytase supplemented diet. Phosphorus excretion (g/Kg DM intake) was significantly **(P≤0.05)** reduced in enzyme supplemented group (T_3) compared to unsupplemented and standard control groups. Lowering of available phosphorus in the diet resulted in a significantly reduction in phosphorus excretion in the droppings. Nernberg *et al.* (1997) also reported reduction of phosphorus excretion in the droppings by phytase supplementation.

Although the chicks fed on enzyme supplemented diets exhibited slightly higher serum inorganic phosphors values than the chicks fed on unsupplemented and standard diets, there was no significantly difference between treatments. Roberson and Edwards (1995) could not observe any effect on plasma calcium and phosphorus in broiler chicks fed diets supplemented with phytase. In the present study, the better utilization of phosphorus in chicks was indicated by the significantly (P≤0.01) higher body weight, tibial ash, superior feed efficiency and reduced phosphorus excretion by the chicks fed on phyzyme – PA supplemented diet. As the enzyme supplemented experimental diet employed in this study was devoid of inorganic phosphorus supplement, it is inferred that the phyzyme – PA supplementation improved the utilization of phytate phosphorus by the colour broilers.

Summary

Phyzyme – PA supplementation significantly (P<0.01) improved 8^{th} week body weight, feed intake, feed efficiency and tibial ash content. Whereas phosphorus excretion was significantly (P≤0.05) reduced in enzyme supplemented group having greater impact on environmental concern. Hence, Phyzyme – PA supplementation has positive effect on the utilization of phytate phosphorus by in colour broilers.

Table 1. Performance and Phosphorus Utilization in Coloured broiler chicks fed with low available phosphorus diets.

S. N.	Parameter	T1 Standard	T2 LAPBR	T3 LAPBR + Phyzyme PA
1.	Eighth week Body weight (g)**	$1965.54^{a} \pm 22.95$	$1900^{b} \pm 33.23$	$2042.86^{a} \pm 32.52$
2.	Feed intake (g)**	$4542^{a} \pm 24.40$	$4314^{c} \pm 44.32$	$4441^{b} \pm 34.89$
3.	Feed efficiency ** (feed: body wt.)	$2.29^{b} \pm 0.04$	$2.78^{a} \pm 0.03$	$2.19^{c} \pm 0.03$
4.	Tibial ash (%)**	$42.80^{a} \pm 0.13$	$39.10^{b} \pm 0.32$	$42.98^{a} \pm 0.67$
5.	Phosphorus excretion * (g/Kg of DM intake)	$4.85^{a} \pm 0.25$	$4.10^{b} \pm 0.42$	$3.50^{c} \pm 0.67$
6.	Serum inorganic phosphorus ^{NS} (mg per cent)	5.74±0.71	5.40±0.63	5.80±0.56

LAPBR – Low Available phosphorus Broiler Ration

Mean bearing the same superscript do not differ significantly (P≤0.01).

** Highly significant (P<0.01), * Significant (P<0.05), NS – Not Significant

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