EFFECT OF PHYTASE SUPPLEMENTATION IN LOW ENERGY-PROTEIN DIET ON THE PRODUCTION PERFORMANCE OF LAYER CHICKEN

P.Ponnuvel, K. Narayanankutty, A.Jalaludeen and P. Anitha

Centre for Advanced Studies in Poultry Science
College of Veterinary and Animal Sciences
Kerala Veterinary and Animal Sciences University
Mannuthy- 680651.

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Corresponding Author : ponnuvelpalanivel@gmail.com

ABSTRACT

A production trial was carried out using 80 Single Comb White Leghorn hybrid Athulya layers to study the effect of phytase supplementation in low energy-protein diet on the production performance in comparison with standard layer ration for a period of 20 weeks. Phytase was supplemented at 0, 500 and 1000 units/kg in low energy- protein layer diet containing available phosphorus of 0.30 per cent from 21 to 40 weeks of age. Egg production, feed efficiency and egg weight were significantly improved (P<0.01) among phytase supplemented dietary treatments when compared with negative control. However, feed intake was not differed significantly.

KEY WORDS : Phytase, layer, egg production

INTRODUCTION

Indian poultry industry is one of the fastest growing agricultural sectors. Layer industry is growing at the rate of five to seven per cent annually. One of the most challenging constraints faced by layer farmer is ever increasing feed cost. Availability of grains and oil cakes also limited due to several factors like export, human consumption, ethanol production and monsoon failures etc. However the grain by products like wheat bran and rice bran are available in plenty at cheaper cost. Use of these by products in chicken feed is limited due to high fibre content and presence of anti-nutritional factors. Phytate is one of the anti-nutritional factors which prevent utilisation of nutrients by birds. Phytate was also known to form complexes with several cations, amino acids, fatty acids and starch. Addition of exogenous phytase enzyme in poultry feed will hydrolyse the phytate and releases phytate bound nutrients. In the present study, an attempt was made to evaluate the production performance of Athulya hybrid layer fed with low energy-protein diet supplemented with exogenous phytase enzyme.

MATERIALS AND METHODS

Eighty Single Comb White Leghorn hybrid Athulya layer chicken of 20 week old were distributed at random into four treatments viz. T1,T2,T3,T4 with four replications in each treatment and each replicate having five birds. The production trial was conducted from 21 to 40 weeks of age. Two types of rations viz., standard layer ration (SLR) as per BIS (1992) and low energy-protein layer ration (LEPR) with 0.30 per cent available phosphorus were used in this study. The birds were housed in individual cages. Feed and water were supplied *ad libitum* throughout the experimental period of 20 weeks. The details of treatment particulars were as follows: T1: Standard layer ration without phytase, T2: low energy-protein layer ration without phytase-negative control, T3: LEPR with phytase 500 units/kg, T4: LEPR with phytase 1000 units/kg.

Individual egg production record of all the birds was maintained throughout the experimental period. From this data, per cent hen housed egg production was calculated. Feed intake was recorded

replicate-wise in each week. From this data daily feed intake per bird and feed efficiency (feed per dozen egg) were calculated. Data on egg weight was recorded from the weighment of all eggs collected during the last three consecutive days of each 28-day period. All the data were subjected to statistical analysis as per Snedecor and Cochran (1994).

RESULTS AND DISCUSSION

Egg production

Overall mean per cent hen housed egg production of phytase supplemented groups (Table) was 93.00 and 93.93 for the treatment groups T3 and T4 respectively which was significantly (P<0.01) higher as compared with T2 (83.71). Birds fed with SLR (T1) produced significantly (P<0.01) more compared with negative control (T2) and was statistically comparable with phytase supplemented groups.

Table. Effect of phytase supplementation in low energy-protein diet on production performance of Athulya layers

Parameters	Treatments			
	T1	T2	T3	T4
Egg production* (per cent HH)	$91.50^{a} \pm 0.55$	$83.71^{b} \pm 2.16$	$93.00^{a} \pm 1.17$	$93.93^{a} \pm 0.67$
Feed intake* (g)	$113.22^{a} \pm 1.14$	$116.40^{b} \pm 0.98$	$114.97^{a} \pm 0.92$	$115.60^{a} \pm 0.52$
Feed conversion ratio*	$1.49^{a} \pm 0.01$	$1.64^{b} \pm 0.01$	$1.49^{a} \pm 0.02$	$1.48^{a} \pm 0.02$
Egg weight* (g)	$52.77^{a} \pm 0.66$	$51.08^{b} \pm 0.28$	$53.36^{a} \pm 0.48$	$54.22^{a} \pm 0.29$

**Means within a row with no common superscript differ significantly (P<0.01)*

The per cent improvement in egg production was 7.79, 9.29 and 10.22 for treatments viz., T1, T3 and T4 respectively as compared with negative control (T2).

Significant improvement in egg production due to supplementation of phytase in low phosphorus layer diet also reported by Panda et al. (2005), Liu *et al.* (2007), Plumstead *et al.* (2007), Hughes *et al.* (2008) and Zaghari *et al.* (2008) and Ponnuvel et al. (2014).

Feed intake

Stastical analysis of mean daily feed intake of birds fed different dietary regimen with or without supplemental phytase revealed no significant difference among various treatment groups. Phytase supplementation numerically decreased the feed intake of birds when compared with unsupplemented

LEPR fed group. Similar observations were made by Hughes *et al.* (2008), Zaghari *et al.* (2008), Alps *et al.* (2010), Hassanien and Elnagar (2011), Meyer and Parson (2011) and Ponnuvel *et al.* (2014).

Feed conversion ratio

Significantly higher mean FCR values were noted for birds in T2 (1.64) when compared to all other dietary treatments (Table). Addition of phytase to LEPR revealed significantly lower FCR values when compared with their negative control and was comparable with birds fed SLR. Significantly, improved feed efficiency was observed by Panda et al. (2005), Plumstead et al. (2007), Ahmadi *et al.* (2008), Hughes *et al.* (2008), Zaghari et al. (2008), Ali *et al.* (2009), Mohammed *et al.* (2010) and Hassanien and Elnagar (2011) and Ponnuvel *et al.* (2014).

Egg weight

Supplementation of phytase in the experimental ration significantly improved the mean egg weight when compared with birds fed LEPR (T2). The mean egg weight of phytase supplemented diet fed groups (T3 and T4) was statistically comparable (Table). Similarly, Liu *et al.* (2007) Ahmadi *et al.* (2008) and Ponnuvel *et al.* (2014). recorded significantly higher egg weight in phytase supplemented diet fed layer chicken.

Based on the results of this experiment it can be inferred that the energy, protein and available phosphorus levels can be reduced simultaneously in layer diet with addition of phytase at either 500 or 1000 units/kg. Phytase supplementation in low energy protein layer diet significantly increased egg production, feed efficiency and egg weight in Athulya hybrid layers.

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