The Influence of Vitamin D3 Levels on Diets with Phytase on Production Performance of Layer Quail (*Coturnic coturnic japonica*)

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ABSTRACT: The aim of this research is to know of influence vitamin D3 levels on performance of layer quails on diets with phytase. Laying quails which was used 560 heads on 40 days old. Phytase and vitamin D3 were used a commercial product. The treatment of this research used corn-soybean diets with levels P0 (Basal diets Pav 0.5%; 500 FTU/kg phytase; 250 ICU/kg vitamin C). P1 (P0 + 500 mg/kg vitamin D), P2 (P0 + 1.000 mg/kg vitamin D), P3 (P0 + 1.500 mg/kg vitamin D) and P4 (P0 + 2.000 mg/kg vitamin D). The variable used feed comsuption, feed convertion, egg production and egg weight. Experimental design used one way completely randomized design with five replication and replicated sampels with five head layers quail. Statistic analytical with analysis of varians, if it was significantly on mean treatments was analyzed by Duncan Test. The results showed feed comsuption, feed convertion, egg weight and egg production were not significantly ($P<0.05$). Feed comsuption, egg production, egg weight and feed convertion with addition levels of vitamin D3 on performance of layer quails on diets with phytase did not improved than control diets.

Keywords: Vitamin D3, phytase, laying quail, production performance, corn-soybean diets.

INTRODUCTION

Phytic acid binded 80% P on grain. Phytic acid is not digestibled in poultry gastrointestinal and decreased nutrient value of feed from agricultural crops (Saryska *et al.,* 2005). Phytic acid of feed that can not be digested will be disposed of the form of excreta in the form of phytat bond with P (Jendza *et al.,* 2006). The source of non-ruminant livestock waste contained phytat-P which is source of pollution (Daniel *et al.,* 1988). Phytase was used to decreased P excretion of feed (Mosenthin dan Broz, 2010). Phytase hidrolized phytic acid, so that phytic acid did not pollute the environment and phytat-P can be utilized by livestock (Mittal *et al.,* 2011). Application of phytase in broiler chicken feed decreased the excretion of N thereby lowering ammonia pollution to the environment (Dozier III *et al.,* 2008). Besides the utilization of phytase can be influenced production performance of quail (*Coturnic coturnic japonica*) (Yasar dan Desen, 2014).

Vitamin D3 can increase digestiblility of protein, lipid and mineral with increasing Ca on intestinal digestibility. Addition of vitamin D on poultry diets can increase Ca on intestinal digestibility so that effectiveness of phytase can be increased (McDowell, 2000) but did not incluence on effectiveness of performance production of broiler chicken (Delezie *et al.,* 2012). Addition of 600 FTY/kg phytase and 5 ug/kg vitamin D3 can increase mineral digestibility on broiler chicken (Aksakal dan Bilal, 2002). Addition of vitamin D3 on laying quail diets with containing phytase and Pav certain to study in Indonesia with tropical climate. The tropical climate is heat stress for laying quail so that interesting to study.

The aim of this research is to know the effect of vitamin D concentration on poultry diets based corn-soybean diets which contains 500 FTU/kg and 0.5 Pav to performance production of laying quail (*Coturnic coturnic japonica*).

MATERIALS AND METHODS

This research used feed with four levels diets treatment that were P0 = basal diets (500 FTU/kg phytase, 0.5 Pav, 250 ICU/kg vitamin C), P1 = basal diets + 500 mg/kg vitamin D3, P2 = basal diets + 1.000 mg/kg vitamin D3, P3 = basal diets + 1.500 mg/kg vitamin D3 and P4 = basal diets + 2.000 mg/kg vitamin D. Research used 500 heads laying quail. Nutrient composition of feed and diet formulation featured on Table 1 and 2.

Table 1. Nutrient content of feed ingredients of diets

Feed Material	ME	CP	Ca	P av	Lysin	Met	Vit. C
	Kkal/kg	----------%----------					
Yellow corn[1)]	3,350.00[1)]	7.33[2)]	0.02[2)]	0.08[2)]	0.26[1)]	0.18[1)]	-
Bran[1)]	2,980.00[1)]	10.77[2)]	0.07[2)]	0.22[2)]	0.59[1)]	0.26[1)]	-
Soy bean meal[1)]	2,230.00[1)]	46.462[2)]	0.29[2)]	0.27[2)]	2.69[1)]	0.62[1)]	-
Fish flour	2,820.00[1)]	52.21[2)]	5.11[2)]	2.88[2)]	4.17[2)]	1.51[2)]	
Coconut oil[1)]	8,600.00[1)]	-	-	-	-	-	-
DL-Metionin[1)]	-	-	-	-	-	99.00[1)]	
Dicalcium phosphate[4)]	-	-	29.00[1)]	18.00[3)]	-	-	-
Limestone[1]	-	-	38.00[3)]	-	-	-	-
Premix[(3)]	-	-	0.00[4)]	03.00[4)]	-	-	-
Vitamin C							35.30

Source: 1) NRC (1994)
2) Mineral B12 (Eka Farma Product. Semarang)
3) Hartadi *et al.* (1994)
4) Laboratory analysis of Chem Mix Pratama

Table 2. Diets Composition and Nutrient Content Treatment Diets

Bahan Pakan	P0	P1	P2	P3	P4
	----------%				
Yellow corn	48,000	48,000	48,000	48,000	48,000
Bran	16,983	16,983	16,9830	16,983	16,983
Soy bean meal	19,700	19,700	19,700	19,700	19,700
Fish flour	7,000	7,000	7,000	7,000	7,000
Coconut oil	0.830	0.830	0.830	0.830	0.830
DL-methionin	0.050	0.050	0.050	0.050	0.050
Dicalsium phosphate	0.810	0.810	0.810	0.810	0.810
Limestone	6.050	6.050	6.050	6.050	6.050
Premix	0.250	0.250	0.250	0.250	0.250
NaCl	0.250	0.250	0.250	0.250	0.250
Phytase	0.010	0.010	0.010	0.010	0.010
Vitamin C	0.067	0.067	0.067	0.067	0.067

Vitamin D	0	0.0005	0.001	0.0015	0.002
Amount	100,000	100,000	100,000	100,000	100,000
Nutritional content					
Metabolizable energy (kcal/kg)	2,800.080	2,800.080	2,800.080	2,800.080	2,800.080
Crude protein (%)	18,010	18,010	18,010	18,010	18,010
Ca (%)	3,300	3,300	3,300	3,300	3,300
P available (%)	0.500	0.500	0.500	0.500	0.500
Lysin (%)	1.040	1.040	1.040	1.040	1.040
Methionin (%)	0.410	0.410	0.410	0.410	0.410
Vitamin C (%)	0.025	0.025	0.025	0.025	0.025

Source : Based on the calculation of feed content from Table 2.

Maintenance management of this research included feeding, dringking, vaccination, drug based Medion, and diets nutrient standart based on SNI. Variable observed on this research were feed consumption (FC) on g/heads/day, egg production in the HDA on egg/head, egg weight on g and feed convertion ratio (FCR) (Tillman *et al.*, 1989).

RESULTS AND DISCUSSION

The results of this research in the form of averages of production performance in quail (*Coturnic coturnic japonica*) is shown in Table 3.

Table 3. The average of production performance with treatment levels of diet on this research (P0. P1. P2. P3. P4)

Variables	P0	P1	P2	P3	P4	Pr. F
FC (g/head/day)	18.89	18.93	18.91	18.97	19.17	0.972
Egg production (egg/head)	57.81	56.88	58.48	54.95	57.75	0.688
Egg weight (g/head)	9.02	9.18	8.88	8.90	8.90	0.136
FCR	3.88	3.82	3.76	4.17	3.89	0.112

Production performance was not signicicant on the levels treatment of vitamin D3 on research diets of laying quail. Production performance on P0, P1, P2, P3 and P4 had same results that did not different on the effect of treatments to added vitamin D3 with concentration 0, 500, 1.000, 1.500 and 2.000 mg/kg on the diets. Several studies on poultry showed similar results. Diets containing cholcalciferol (vitamin D3) with concentration 0 and 75 mg/kg-1 did not significant difference to FC and FCR on duck (Onyango dan Adeola. 2011). Weight gain. FC and FCR on broiler chicken with deficiency P by phytase and 1a- OHD3 did not significant difference (Driver *et al,* 2005). Feed consumption, egg production and egg weight on laying hen did not difference with addition phytase and 1.25-(OH)2D3 (Carlos dan Edwards, 1998).

CONCLUSION

Production performance with addition vitamin D on concentration 0, 500, 1.000, 1.500 and 2.000 mg/kg on the diets with 500 FTU/kg phytase and 0.3% Pav and basal diets had similar quality.

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