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The Effect of Zeolite on Performance of Japanese Quails In The Tropical Climate

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ABSTRACT: A research used zeolite has been established to obtain the optimum level of zeolite and its effect on performance and carcass percentage of Japanese quails inthe tropical condition. Three hundred and eighty five of one week old unsexed quails used in this experiment, treated 2 levels of protein (24% and 20%) and 4 levels of zeolite (0, 2.5, 5 and 7.5%). It had 3 replication for each treatment. Twenty five percent of the total male quails from each treatment were taken for carcass analysis. The data obtained from performance was analized using analysis of variance of 2x4 factorial Completely Randomized Design. Different between treatment were tested using the Least Significant Difference Test. The results showed that levels of 7.5% zeolite in quail ration resulted non significant effect on body weight gain, feed consumption, feed conversion ratio and carcass percentage. The level of protein resulted significant ($P<0.05$) effect on body weight gain, feed consumption but non significant effect on feed conversion ratio.

Keywords : Nutrition, Zeolite, Quails, Tropical

Introduction

The requirement of animal protein correspond to the increase of population that followed by education on their nutritional needs. But the speed on producing animal protein from large animal can not always compete with the increase of protein requirement.

As alternative to this speed of protein requirement and to make better family income as well, quail farming can be introduced to the farmer for these birds have potential in producing meat and eggs.

The high productivity in quail farming could be obtained by good management, breeding and controled feeding. To deal with their feed, inclusion of zeolite to the diets is one of many ways to increase digestibility in achieving feed efficiency and a good performance of these birds.

Source of zeolite vulcanic minerals are almost spreading in all over Indonesia (Harjanto, 1983). According to the Institute for Mineral Technology (1985), 30 out of 40 zeolite location in Indonesia is in Java. Zeolite is used in many industries such as pulp, rubber, plastic, fertilizer, natural gas, or in animal feed as poluttan supressor (Harjanto, 1983).

It has been shown by Karelina (1985), zeolite inclusion to broiler feed was able to increase final body weight. Ballard and Edward Jr. (1988) were adding zeolite by 0, 0.25, 0,5 and 1.0 % to male broiler feed with the result increase of absorbtion and retention of Ca but without any influence on body weight and feed conversion. Other results was that zeolite inclusion decreased tibial dyschondroplasia cases.

This research was aimed to know the influences and benefit on quail performance by using zeolite in their feed with different levels of protein content.

Experimental Procedures

General. For this research, a week old 384 unsexed quail were used. They originated from quail breeding farm in Sukabumi.

The birds randomly put in 24 wire cages (battery colony) by 16 quail per unit. Experimental diets as shown in Tabel 1., consist of 2 protein levels (24 and 20%) and 4 levels of zeolite (0, 2.5, 5.0 and 7.5%). An isocaloric diet of 3000 kkal metabolize energy per kg feed was used (NRC, 1984).

The quantitated indicators measured were body weight, feed consumption, feed conversion, and percentage of carcass body weight (the male used 25 % birds per replication).

Table 1. Composition of the experimental diet (%)

Ingredients	R1	R2	R3	R4	R5	R6	R7	R8
Yellow corn	42.53	44.30	38.62	38.37	55.66	57.66	55.45	52.47
Soybean meal	29.18	27.39	28.45	28.34	25.76	22.26	21.10	20.45
Rice bran	13.02	8.53	8.77	5.23	9.47	6.32	5.00	4.07
Fish meal	10.00	12.00	12.00	12.87	4.69	7.62	9.05	10.14
Coconut oil	5.00	5.00	6.89	7.42	3.15	3.00	3.92	5.08
Premix-A	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Santoquin	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025
Zeolite	0.00	2.50	5.00	7.50	0.00	2.50	5.00	7.50
T o t a l	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Calculated Analysis:								
Energy Metabolis (kcal ME/kg)	3000	3000	3000	3000	3000	3000	3000	3000
Crude protein (%)	24	24	24	24	20	20	20	20
Calcium (%)	0.82	0.95	0.95	1.00	0.80	0.80	0.80	0.80
Phosphor (%)	0.66	0.63	0.63	0.59	0.50	0.50	0.50	0.50
Crude fibre (%)	4.63	4.09	4.02	3.62	4.26	3.80	3.54	3.34
Lysine (%)	1.30	1.29	1.30	1.30	1.07	1.04	1.03	1.03

Statistical analysis. Data obtained were analysed using Analysis of Variance following a Completely Randomized Design of 2x4 factorial with three replication/diet. The different between means were tested by Significant Different Test (LSD) (Steel and Torrie, 1986).

Results and Discussion

The effect of zeolite and protein level on weight gain

Statistical analysis show that zeolite inclusion until 7.5 % in the diet give no significant different in weight gain. This results was correspond to Wijaya (1988) who give 0.5, 1.0 and 1.5 % zeolite in quail diet for 3 to 6 week. Only inclusion of 1.5 % zeolite have significantly decreased their feed consumption ($P<0.05$).

The above results were different when compared to broiler chickens reported by Willis et al (1982) who use 2 and 3 % zeolite in their feed. Their results was significantly increasing male weight gain ($P<0.05$). Herbert et al (1986) used 0.66 and 0.99 % zeolite in the diet and able to increase their broiler body weight when compared to control.

The weight gain of quails increase in this research was significantly effected by protein level of their feed. Diet with protein level of 24 % gives higher weight gain (92.95 g/bird) comparaed to 20 % protein (84.34 g/bird). This result was supported by Gleaves and Dewan (1971) who showed the increase in body weight was influenced by protein and energy levels of the feed.

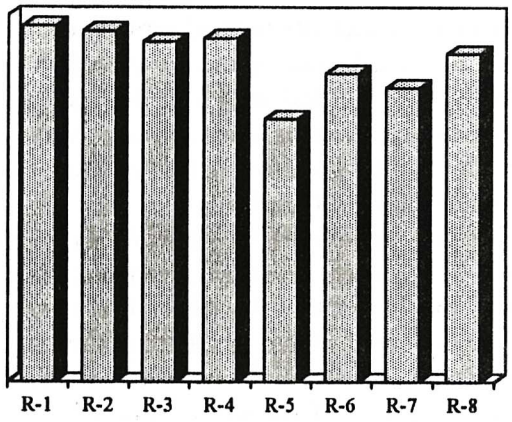

Figure 1. Weighht gain of quail at 6 weeks of age (grams)

The effect of zeolite and protein level on feed consumption and conversion

Inclusion of zeolite by 7.5 % in quail feed for 5 weeks gives no significant effect the their feed consumption and conversion (see Table 1). The results is in agreement with waldroup et al (1984) who gave 1 % zeolite inclusion to broiler feed from 21 - 49 days (protein level 20 %). Dion and Crew (1984) had made different results. 5 % zeolite in broiler feed with low protein level (18%) for 5 weeks had significantly increasing feed conversion (P,0.05). Nakaue et al (1981) were stating that 10% clinoptilolite in broiler feed was not able to increase significantly the birds body weight, feed consumption, feed conversion until 49 days old, but effecting significantly in reducing litter humidity between 8.7 - 11% and ammonia level (NH3-N) untuil 9 - 15%.

Table 2. The average weekly body weight of quail during 6 weeks experiment (grams/bird)

Treatment	Age (days)					
	7	14	21	28	35	42
R 1.	14.35	23.46	40.90	69.33	92.48	108.32
R 2.	13.79	22.21	40.29	65.73	86.72	107.44
R 3.	14.10	24.27	42.54	68.54	90.63	105.69
R 4.	13.65	23.27	39.70	65.60	89.49	106.25
R 5.	13.23	21.33	34.27	51.76	71.24	93.12
R 6.	13.60	21.67	36.80	61.69	80.40	100.63
R 7.	13.81	20.42	32.50	58.88	74.88	98.28
R 8.	13.85	22.83	39.62	62.49	84.16	103.82

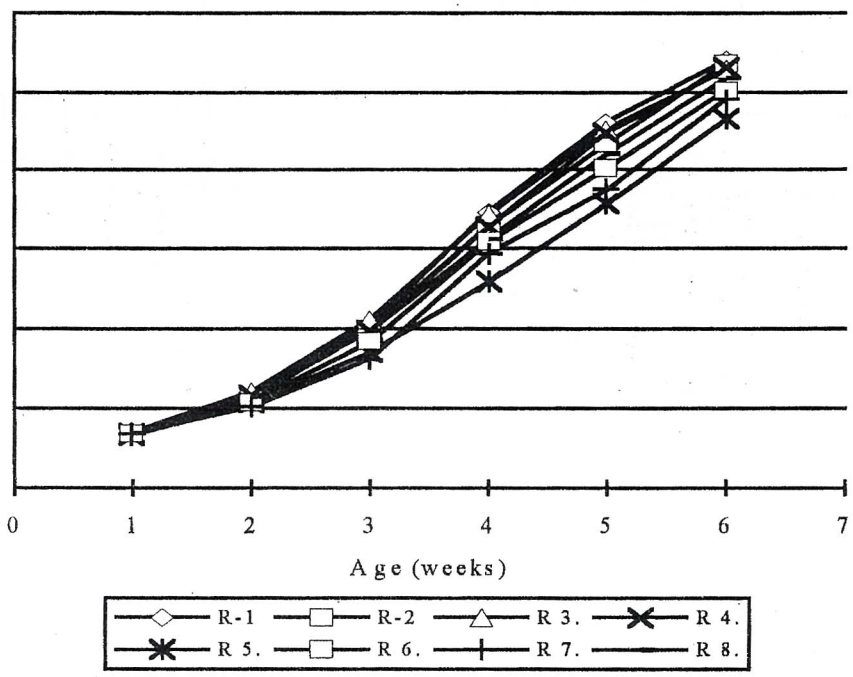

Figure 2. The average weekly body weight of quail during 6 weeks experiment (grams/bird)

Table 3. The average body weight gain, feed consumption, feed conversion ratio and carcass percentage at six weeks experiment[1]

	Treatment	Weight gain (g/bird)	Body weight (g/bird)	Feed intake (g/bird)	FCR (g/g)	Carcass weight[2] (%)
1.	Z 0%;CP 24%	93.37	108.32	429.63	4.57	66.60
2.	Z 2.5%;CP 24%	93.65	107.44	435.24	4.66	66.36
3.	Z 5.0%;CP 24%	91.59	105.70	436.68	4.77	66.47
4.	Z 7.5%;CP 24%	92.60	106.25	418.94	4.54	65.10
	Average	92.55[b]	106.93	430.12[a]	4.64[a]	66.13[a]
5.	Z 0%;CP 20%	78.89	93.12	404.27	5.06	65.43
6.	Z 2.5%;CP 20%	87.02	100.63	400.26	4.60	65.93
7.	Z 5.0%;CP 20%	84.47	98.28	413.80	4.95	65.05
8.	Z 7.5%;CP 20%	86.96	103.82	419.56	4.67	65.12
	Average	84.34[a]	98.96	409.47[a]	4.82[a]	65.58[a]

[1] Value (in each row) with differents superscripts differ significantly (P<0.05).
Z = Zeolite, CP = Crude Protein
[2] = carcass of male quails

Table 3 shows that dietary treatments have no effect on feed consumption and feed conversion. Quail fed on 24 % protein level indicate an increase of feed consumption compared to diet with 20 % protein eventhough statistically was not significant (P>0.05).

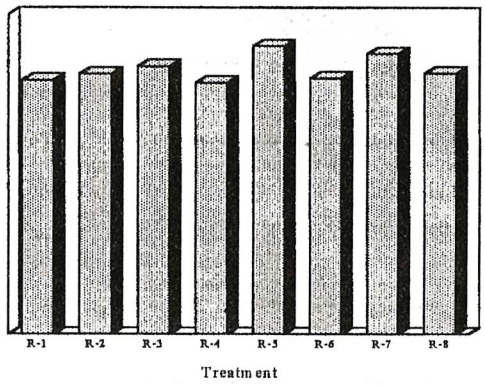

Figure 3. Feed conversion of quails at 6 weeks (grams/grams)

Effect of zeolite and protein level in the diet on the percentage of male quail carcass weight

The results of statistical analysis of variance showed thet percentage of male carcass weight was not effected by levels of zeolite, protein, and their interaction. The average percentage for male quail carcass weight was 65.76 % of their live weight. This carcass percentage weight was corelated to their live weight, in sense that the more higher live body weight the more carcas body weight produced.

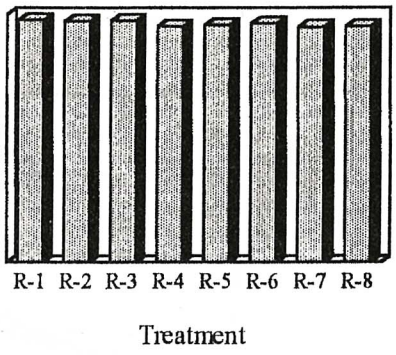

Figure 4. Percentage of carcass weight of at 6 weeks (grams)

Implications

1. Inclusion of zeolite in the quail feed gives no effect on body weight conclusion, feed consumption, feed conversion, and percentage carcas weight.

2. The different of protein levels in the diet high significantly on quail body weight gain ($P<0.01$) and also significantly their feed consumption ($P<0.05$).
3. There is no interaction occured between zeolite and protein levels with quail performance.
4. Zeolite in able to reduce litter humidity and ammonia level with the end results that ammonia polution to the surrounding air will be decrease by zeolite higroscopic and deodorize ability to combat foul odor.

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