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EFFECT OF VARYING ENERGY AND PROTEIN LEVELS ON THE PERFORMANCE OF JAPANESE QUAILS

. Altaf-ur-Rehman Barque, Haq Nawaz, Gulraiz Ahmad & Muhammad Yaqoob
Faculty of Animal Husbandry,
University of Agriculture, Faisalabad

In a six week trial, 360 day-old Japanese quail chicks were fed on 12 experimental rations containing 4 levels of protein (20, 22, 24 and 26%) each with 3 levels of energy (2600, 2800 and 3000 k.cal. ME kg-I) and the data on feed consumption, weight gain, feed efficiency and muscle composition were recorded. The feed was offered *ad libitum*. Maximum weight gain (137.07 g) was observed in quails fed ration containing 26% protein with 2800 k.cal. ME kg-I energy. Minimum feed consumption and better feed efficiency was noted in birds fed 26% protein. Ten birds of either sex on each ration were picked up at random and slaughtered to determine muscle composition. Non-significant differences were found among the treatments in everting influence on weight gain, feed consumption, feed efficiency and muscle composition.

INTRODUCTION

Quail is widely used as a source of human feed in parts of orients as a delicacy and it helps in overcoming the animal protein shortage in under developed countries such as Pakistan. The information available in Pakistan concerning the nutritional requirements of the quail is rather limited, since very little work has been done here. The quails, therefore, are being raised on broiler starter ration and farmers are unable to get optimum performance from them. Thus, it is imperative to investigate the nutrient requirements of quails under local conditions if their potential is to be exploited to the maintenance level. The major constraint in the quails production is the non-availability of economical and efficient rations. No information, however, exists about the changes in breast muscle protein, ether extract and ash contents of quails by feeding rations having different energy and protein levels. As various meat parameters could prove good indices of nutritional effects (Shrivastavet *al.,* 1982) and their measurement seems to he important for nutritional evaluation of rations having different ener&'Y and protein levels.

MATERIALS AND METHODS

Three hundred and sixty day-old chicks were raised for a period of six weeks at old Animal Nutrition Research Centre, University of Agriculture, Faisalabad (Pakistan). The chicks were randomly divided into 36 replications of 10 birds each. Four levels of protein i.e. 20, 22, 24 and 26% each with 3 levels of energy i.e. low (2600), medium (2800) and high (30000) k.cal. ME kg-I were tested. For these 12 treatments, there were 3 replicates in each treatment. Room temperature was maintained at 35' C at the start of the experiment. The temperature was lowered by 3' C each week till the end of 4th week, after which the temperature was maintained at about 23 • C. Ten birds of either sex on each ration were picked up at random and slaughtered to record data on

muscle composition. The data on feed intake, weight gain, feed efficiency and muscle composition was statistically analysed by using the analysis of variance technique (Steel and T< rrie, 1980).

RESULTS AND DISCUSSION

Weight gain: The average weight gain chick-1 fed on 20, 22, 24 and 26% protein was 127.20, 128.54, 130.43 and 131.37 g, respectively. The average weight gain chick'! during the experimental period on 2600, 2800 *and* 3000 *k.cal.*, ME kg-I *was 128.40, 132.82* and 130.47 g, respectively. The statistical analysis revealed non-significant differences due to protein, energy and interaction between them (Table 1). The results arc in agreement with Vohra and Roudybush (1971) who reported that weight gain was not affected significantly by increasing protein level from 20 to 30%.

as compared to fed on ration providing 2600 and 2800 k.cal. ME kg-I. The differences due to energy levels, protein and interaction between protein and energy were non-significant (Table 1).

Feed elliciency: The average feed efficiency values fed on 20, 22, 24 and 26% protein were 3.12, 3.01, 3.04 and 2.85, respectively. The feed efficiency values of rations containing 2600, 2800 and 3000 k.cal. ME kg-I were 2.98, 2.97 and *2.R7,* respectively. Statistical analysis showed significant differences due to protein but non-significant due to energy *and interaction between energy and* protein (Table 1.).

Breast muscle protein: The average values of protein contents in breast muscle of quail chicks fed 20, 22, 24 and 26% dietary protein were 21.31, 22.22, 22.72 and 23.45%, respectively. The analysis of variance showed significant differences among dietary protein levels (Table 2). Protein contents of the

Table 1.): nalysls or variance or reed consumption, weight gain and feed efflclency

Source of vanance	Df	Mean squares		
		Feed consumption	Weight gain	Feed efficiency
Protein (P)	3	2.()(jNS	0.001NS	6.32W
Energy (E)	2	0.70NS	0.75NS	0.624NS
PxE	6	O.17NS	0.37NS	O.121NS
Error	108			
Total	119			

* = Significant, NS = Non-significant.

Feed consumption: The analysis of variance revealed that birds fed on 20% protein consumed more feed than the birds fed on 26% protein. As .egards the influence of M.E. the birds fed on ration containing 3000 k.cal. ME kg-I feed apparently consumed less feed

breast muscle of quail chicks increased significantly by increasing dietary protein. These results were also supported by Edwards and Denman (1975), Choudhry *et al.* (1985) and Rousebrough and Steelc (1985) who reported that breast muscle protein of

chickens was increased by increasing dietary protein.

among dietary protein and energy levels as well as interaction between protein and

Table 2. Analysis of variance of protein, ether extract and ash contents of breast muscle

Source of variance	Of	Mean squares		
		Protein	Ether extract	Ash
Protein (P)	3	24.25**	0.77**	O.023^{NS}
Energy (E)	2	0,59^{NS}	0,39**	0.002:'\s
PxE	6	2.27**	OJ)9^{NS}	0.0I4:'\s
Error	10X			
Total	119			

* = Significant, NS = Non-significant.

Breast muscle ether extract: The average values of ether extract contents in breast muscle of quail chicks fed 20, 22, 24 and 26% dietary protein were 2.72, 2.X(I,2.% and 3.10%, respectively. Average ether extract contents of the breast muscle of quail chicks fed 2600, 2X00 and 30000 k.cal ME kg-I were 2.81, 2.90 and 3.01%, respectively. The analysis of variance revealed significant differences among dietary energy and protein levels. However, interaction between various levels of protein and energy was found non-significant (Table 2). The results were supported by Lepore and Marks (1971), Edwards (1981) and Shrivastav and Panda (1982) who reported that carcass fat was increased significantly by increasing dietary protein level.

Breast muscle ash contents: The mean ash values of the breast muscle of quail chicks fed 20, 22, 24 and 26% dietary protein were 1,26, 1,131, 1,25 and 1,29%, respectively. The mean ash content of breast muscle of quail chicks fed 2600, 2XOOand 3000 k.cal. ME kg-I were 1,28, 1,26 and 1,27%, respectively. The analysis of variance of the data revealed non-significant differences

energy (Table 2). The results were in accordance with the findings of Choudhary *et al.* (1985) who observed that ash content of broiler chicks was not changed by feeding them diets having dietary protein levels bf 13, 18 or *23{jiJ.* These results arc also in line with the findings of Vo *cl al.* (19X(I) who reported no change in body ash content of guinea fowls by feeding diets with dietary protein levels ranging from 21 to 27%.

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