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The Effect of Dietary L-Carnitine Supplementation on Performance in Japanese Quail from 21 to 42 Day of Age

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Abstract: The objective of this research was to study the effect of dietary L-carnitine supplementation on performance in Japanese quail from 21 to 42 day of age. One hundred ninety-two Japanese quail were fed the same basal diet that was supplementation with 0 (control), 160, 240 and 320 mg L-carnitine/kg of diet. The experimental design was a completely randomized design. Live weight and feed intake were measured for each experimental unit at 21 and 42 days of age and then weight gain and feed conversion ratio was calculated. The results of the study indicate that, The Effect of dietary L-carnitine supplementation at 240 and 320 mg L-carnitine/kg of diet had significantly higher weight gain and feed conversion ratio compared to control group. Data suggest dietary L-carnitine supplementation can be increase weight and improved the performances of Japanese quail from 21 to 42 day of age.

Key words: L-carnitine supplementation · Performance · Japanese quail

INTRODUCTION

It has been established that an adequate supply of L-carnitine is necessary for the maintenance of good health. L-carnitine, a zwitterionic compound synthesised *in vivo* from lysine and methionine, is essential for the transport of long-chain fatty acids across the inner mitichondrial membrane for β-oxidation [1]. L-carnitine boosts energy by stimulating the body's burning of tryglycerides as fuel and sparing the supply of glycogen stored in the liver for heavier exertion. L-carnitine allows the body to burn more fat, save more glycogen and ultimately boost production and weight. By providing more fat to the muscles, carnitine makes accessible an otherwise unavailable energy source. L-carnitine is an alternative food additive in poultry diets because of its beneficial effects on enhancing resistance to metabolic diseases, preventing some diseases, strengthening immune system, improving poultry performance and playing role in metabolic and physiological processes [2-4]. Quail diet contains a high percentage of cereal grains, which supply low L-carnitine contents [5]. Therefore the present study was conducted to evaluate the effect of dietary L-Carnitine supplementation on performance in Japanese quail from 21 to 42 day of age.

MATERIALS AND METHODS

Japanese quails, 21-day-old were used in this experiment. Four experimental diets were formulated, by adding three levels of supplemental L-carnitine (0 (Control group), 160, 240 and 230 mg/kg) to a basal diet and used from 21 to 42 days of age. Chicks were reared from 21 to 42 d of age and provided with a standard broiler ration (National Research Council) [6]. Food and water were available ad libitum. Body weight and feed intake were measured at 21 and 42 days of age and then feed conversion ratio was calculated. The experimental design was a completely randomized design with four replicates and twelve birds in each replicate. Treatments were analyzed by ANOVA using the general linear models procedure of SAS® software (SAS institute) [7]. When differences among means were found, means were determined by Duncan's multiple range tests [8].

RESULTS AND DISCUSSION

As shown in Table 1, Body weight gain and feed conversion ratio was increased at levels of L-carnitine of 240 and 320 mg/kg than control group ($P<0.01$). It is well established that L-carnitine plays an important role in the mitochondrial oxidation of long-chain fatty acid in the

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Table 1: The effect of dietary L-carnitine supplementation on performance in Japanese quail from 21 to 42 day of age

Levels of L-carnitine added (mg/kg)	Feed intake (g)	Body weight gain (g)	Feed conversion ratio (g)
Control	494.65[b]	97.04[c]	5.09[a]
160	494.65[b]	97.32[c]	5.08[a]
240	496.88[ab]	98.68[b]	5.03[b]
320	496.88[ab]	100.05[a]	4.99[c]
P-Value	0.0175	0.0001	0.0001
SEM	1.03	0.33	0.009

• Different letters (a, b, or c) show significant difference

production of energy and improved the performance. Yalcin *et al.* [9] stated that only the highest L-carnitine dosage (200 mg/kg diet) has induced significant increases of body weights. Dietary L-carnitine supplementation didn't show any significant effect on feed intake of Japanese quail from 21 to 42 day of age. But, dietary L-carnitine supplementation had numerically higher feed intake in chicks that received levels of L-carnitine of 240 and 320 mg/kg than control group. Yalcin *et al.* [10] demonstrate that food intake was not significantly modified by L-carnitine supplementation compared to controls albeit the feed conversion ratio tended to be improved when 200 mg/kg of L-carnitine was added to diets. Feed intake, body weight gain and feed conversion ratio hadn't any significant effect on group received levels of L-carnitine of 160 than control group.

Our results are in agreement with previous studies conducted in laying hens [11], in laying quails [10] and in broilers [12, 13] about feed intake. Similarly, feed conversion ratio was not significantly altered in broilers dietary supplemented with L-carnitine at 50 mg/kg diet [14], 100 mg/kg diet [13], 160 mg/kg diet [15] and 200 mg/kg diet [16].

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