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EFFECT OF SUPPLEMENTATION RATION WITH FISH OIL, L-CARNITINE AND THEIR COMBINATION ON BROILERS PERFORMANCE

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ABSTRACT
This study was designed to identify the effect of fish oil with or without L-carnitine on broilers performance. One hundred fifty unsexed one day-old chicks (Ross 308) were randomly distributed into three equal groups, (50 birds per treatment) with two replicates as following: T1(control) / birds fed basal diet without supplemented while T2/birds fed basal diet supplemented daily 3% fish oil and T3 /birds fed basal diet supplemented daily 3% fish oil and l-carnitine (50mg / Kg). During the experiment period (35 days). Traits involved in this study were body weight; weight gain, feed intake, and feed conversion ratio were measured at the end of the experiment. The results indicate that T3 have a significant ($p<0.05$) increase in body weight, weight gain, feed intake; also feed conversion ratio was improved as compared with T2 and control group. In conclusion that combination of fish oil and L-carnitine can be used during the breeding period with ration could enhance performance and health status of broilers.

KEYWORDS: Broiler, Fish oil, L-Carnitine, Performance.

INTRODUCTION

Fats and oils are important sources of energy among other nutrients (Leeson and Summers, 2005). Supplementation fats increase diet palatability and reduced diet dustiness, thus feed consumption can be increased (Bisplighoff, 1992). Polyunsaturated fatty acids are included omega-3 and omega-6, both of them are considered essential because they cannot be synthesize by body, so it must be obtain from diet (Woods *et al*., 2005). Dietary imbalance of omega-6: omega-3 may contribute to the acute inflammatory response and the prevalence of inflammatory-related disorders in broiler chickens (Gonzalez, 2009). Polyunsaturated fatty acids are important constituents of the immune cell structure and eicosanoid formation (Stulnig, 2003). Therefore, dietary supply of omega-3 PUFAs may affect the development of a strong immune system in birds, increase poultry productivity, reduce disease and thereby contributing to increase economic returns to poultry industry (Gonzales, 2009). From broilers health aspect, omega-3 PUFAs improve immunity, performance, lipid profile besides increasing in marketing weight (Jameel, 2013; Al-Zuhairy and Alasadi, 2013; Sahib, 2013). L-carnitine is a water-soluble quaternary amine that exists naturally in microorganisms, plants and animals (Bremer, 1983). It is biosynthesized in the liver in vivo from two essential amino acids lysine and methionine (Rebouche & Paulson, 1986a) in the presence of vitamin B6, ascorbic acid, nicotinic acid and folic acid. These vitamins are required as co-factors for the enzymes involved in the metabolic pathway of L-carnitine (Rebouche & Paulson, 1986b; Feller & Rudman, 1988; Rebouche, 1991; Baumgartner & Blum, 1993; Arslan, 2006). It has been reported that L-carnitine has two major functions. The best known is to facilitate the transport of long-chain fatty acids across the inner mitochondrial membrane. Thus, dietary L-carnitine supplementation promotes the β-oxidation of these fatty acids in order to generate adenosine triphosphate (ATP) energy and improve energy utilisation (Rabie *et al*., 1997; Neuman *et al*., 2002). Therefore, the present experiment was conducted to investigate the effects of ration that contained 3% fish oil with or without L-Carnitine on broiler performance.

MATERIALS & METHODS

Experimental design

One hundred fifty day-old unsexed broilers chicks (Ross-308) were bought from a commercial hatchery and divided randomly and equally into three treated groups of 50 birds, each treated group was subdivided into two replicates of twenty five birds per replicate. The first group T1(control) / birds fed basal diet without supplemented while T2/birds fed basal diet supplemented daily 0.3% fish oil and T3 /birds fed basal diet supplemented daily 0.3% fish oil and l-carnitine (50mg / Kg).

Rearing Program

The chicks were management according to (Aviagen, 2009). Feed and water provided in *ad-Libitum* during the experiment. A two-phase feeding program consists of offering a starter (1-21 days of age) and finisher (22-35 days of age) was provided to the broilers. Diets were formulated to meet or exceed requirements by the National Research Council (NRC, 1994) table (1). Light was provided the whole day long with only one hour cut off to get them used to the darkness.

Production traits

Production traits were final body weight, feed intake, weight gain and feed conversion ratio. All traits were measured in this study at 35 day-old.

Statistical analysis

Data generated from experiment was carried out in a complete randomized design (Steel and Torrie, 1980).

These data were subjected to ANOVA according to general linear model procedure of SPSS software (SPSS, 2001). The significant differences among means were determined by Duncan's multiple range tests with ($p \leq 0.05$) level of significance.

TABLE 1: compositions of experimental diet according to (NRC, 1994)

Ingredient %	Starter diet			Finisher diet		
	T1	T2	T3	T1	T2	T3
Yellow corn	36	36	36	44	44	44
Soybean meal(48% protein)	30	30	30	26	26	26
Wheat	26	26	26	20	20	20
Protein concentrate	5	5	5	5	5	5
Sunflower oil	1.5	1.2	1.2	3.5	3.20	3.20
Fish oil"	-	0.3	0.3	-	0.3	0.3
L-Carnitine (mg\ Kg)	-	-	50	-	-	50
Premix*	0.1	0.1	0.1	0.1	0.1	0.1
Lime stone	1	1	1	1	1	1
Salt	0.3	0.3	0.3	0.3	0.3	0.3
Dicalcium phosphate	0.1	0.1	0.1	0.1	0.1	0.1
Total	100	100	100	100	100	100
Calculated chemical analysis						
Metabolize energy (kcal/kg)	2926	2926	2926	3097.8	3097.8	3097.8
Crude protein (%)	22.4	22.4	22.4	20.5	20.5	20.5
Calcium (%)	0.82	0.82	0.82	0.80	0.80	0.80
Available phosphorus (%)	0.61	0.61	0.61	0.58	0.58	0.58
Methionine (%)	0.61	0.61	0.61	0.58	0.58	0.58
Lysine (%)	1.74	1.74	1.74	1.63	1.63	1.63

* Premix produced in Jordan (VAPCO®) which contains: vit A 8000000 IU; vit D3 1500000 IU; vit E 1000 IU; vit K3 2000 mg; vit B1 500 mg; vit B2 500 mg; vit B6 200 mg; vit B12 8 mg; ca pantothenate 400 mg; nicotinamide 6000 mg; folic acid 50 mg; methionine 13 mg; lysine 61 mg; aspartic acid 92 mg; glutamic acid 166 mg; cysteine 1 mg; valine 40 mg; tyrosine 9 mg; glycine 382 mg; arginine 117 mg; leucine 48 mg; phenylalanine 40 mg; Mn sulphate 0.40 gm; zinc sulphate 0.15 gm; iron sulphate 0.50 gm; copper sulphate 0.04 gm; cobalt chloride 0.01 gm.

RESULTS & DISCUSSION

The effects of different treatments on body weight, weight gain, feed intake, and feed conversion ratio are shown in (Table 2). The broiler body weight and body weight gain were significantly ($p \leq 0.05$) increased and feed conversion ratio was improved in T3 then T2 respectively as compared with the control group. While, feed consumption were significantly ($p \leq 0.05$) increased in T3 then T2 respectively as compared with the control.

TABLE 2: Effect of different treatments on body weights, weight gain, feed intake, and feed conversion ratio of Ross strain. Mean ± SE

Treatments / Parameters	T1	T2	T3
Body weight (gm)	1833.16±3.7 C	2003.62±3.4 B	2150.25± 3.03 A
Weight gain (gm)	1835.62±2.63 C	1974.7±4.3 B	2098.70±2.14 A
Feed intake (gm)	3005.0±2.99 A	3116.50±2.61 C	3145.50±2.50 B
Feed conversion ratio	1.72 ± 0.004 A	1.62 ± 0.001 C	1.50 ± 0.003 B

Different letters in the same raw denoted significant differences between treatments at a level ($p \leq 0.05$).

Mean body weight, and body weight gain were increased significantly and feed conversion ratio was improved significantly. However, feed consumption was reduced significantly could be due to omega-3 and L-carnitine may improve the energy availability and protecting the cellular membranes Supplying ration with exogenous nutrients could be increased final body weight of broilers through modulating gut morphology of the embryo. Also Fats rich with omega-3 increased growth due to activate of bile which lead to increase digestion of fats in the intestine, and increase efficiency of digestion and absorption of diets in intestine lead to more useful from the diet. The results obtained were in agreement with the suggestion of (El-Sayed and Hashim, 2000; Uni and Ferket, 2003; Al-Zuhairy and Alasadi, 2013; Jameel and Sahib, 2014; Al-Zuhairy and Jameel, 2014).

CONCLUSION

It can be concluded from the results obtained in this study that body weight, weight gain, feed intake, and feed conversion ratio were improved in broilers fed on ration containing (0.3% fish oil and 50 mg/ Kg L-carnitine).

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