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Effect of Canola Oil on the Internal organs and Carcass Weight of Japanese Quail

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Abstract

This experiment was carried out to evaluation usage different levels of canola oil (CO) (0, 2 and 4%) in the basal diet (corn and soybean meal) and their effects on the different parts of carcass weight (breast and thigh) and internal organs weight (liver, heart, spleen, gizzard, proventriculus and abdominal fat) in Japanese quail. A total of 135 Japanese quail were randomly divided in to 3 experimental treatments with 3 replicates (15 birds per pen) and arranged in a completely randomized design. The experimental period lasted 6 weeks and during this period, the birds have free access to feed and water. Experimental diets consisted of: Basal diet 0% canola oil, basal diet with 2% canola oil and basal diet with 4% canola oil. These diets were isonitrogenous and isoenergetic were given to Japanese quail throughout a 42-d growth period. Data was analyzed with one way ANOVA and means compared with Duncan test. Three male Japanese quail selected with each pen and slaughtered. Results showed canola oil in levels of the 4 and 2% (T3 and T2, respectively) significantly increase the chilled carcass weight, breasts, thighs, livers weight ($p < 0.0001$), in relationship to basal diet, as the 3 treatment include of 4% canola oil has a highest effects. But canola oil in the all of the treatment not affected on the gizzards, spleens and hearts weight. Result showed canola oil in levels of 4 and 2% (T3 and T2, respectively) significantly decrease the abdominal fat deposition ($p < 0.0001$) in relationship to basal diet, as the 3 treatment include of 4% canola oil has a highest effects.

Key words: Japanese quail, canola oil, internal organs, breast and carcass.

INTRODUCTION

Oils have commonly been used as energy sources in the diets for animals specially broiler and quail in grower and finisher periods. Japanese quail industry is increasing dramatically throughout the developing countries. There have been notable increase in growth rate and feed

efficiency in quail in last 20 years. Nowadays human need a foremost food for a attain the best peace. Hereof, advert to alimentation of human is very important for a nutrition critic. Current commercial hybrids with high energy diets which would enable the maximum exploitation of those genetic potential. Canola oil provides varying quantities of the essential nutrient good fats. It is very high in monounsaturated fat; contain intermediate amounts of the precursor omega-6 and omega-3 polyunsaturated fatty acids Linoleic Acid (LA) and Alpha Linolenic Acid (ALA) respectively and is very low in saturated fat. Canola oil as a good contains significant amounts of vitamin E and phytosterols. Over all in this study it has seem the use of the canola oil in Japanese quail diets improved the feed efficiency rate and the increase the production parameters. The aims of this study are the evaluations improvement of the carcass yield and internal organs weight with consumption of dissimilar canola oil in diets.

MATERIALS AND METHODS

Animals and diets: A total of 135 one-day old Japanese quail chicks of from male and female sex were placed in 9 pens of 1×1 meters with ten birds per each pen. Feed and water were provided *ad libitum*. The experimental design consisted in a completely randomized design with 3 treatments [T1 Control (soybean + corn), T2 (2% CO) and T3 (4% CO)] with three replication. The treatment diets of were isonitrogenous and isoenergetic. Diets were formulated by adding 0, 2 and 4% canola oil be based diet (corn and soybean meal) that met requirement recommended by the National Research Council (1994).

Table 1: Percentage composition of experimental diet in starter period

Ingredients	(%)
Corn	53.5
Soybean	34.5
Canola Oil	0
Starch	8
Wheat bran	0
DL-Methionine	0.54
Lysine	0
DCP	1.38
Oyster	1.33
Vitamin	0.25
Mineral	0.25
Salt	0.25
Coccidiostat	0
Sand	0
	100
Calculated nutrient content	
ME kcal/kg	2920
Crude protein (%)	21
Calcium (%)	0.94
Available P (%)	0.43
ME/CP	139.7
Ca/P	2.1

1: Vitamin content of diets provided per kilogram of diet: vitamin A, D, E and K. 2: Composition of mineral premix provided as follows per kilogram of premix: Mn, 120,000mg; Zn, 80,000mg; Fe, 90,000mg; Cu, 15,000mg; I, 1,600mg; Se, 500mg; Co, 600mg

The control diet, which was not enriched with canola oil and was administered throughout the 21 days of experimental period (starter). The levels of canola oil were replaced with corn in diets during 2 different periods (grower and finisher). Ingredient composition and nutrient analysis for each treatment is described in Table 1-3. In the end of the experimental, 4 birds from each replicate were slaughtered and different part of body weighted. Mortality was also recorded for each treatment.

Table2: Percentage composition of experimental diet in grower period

Ingredient	Experimental diets		
	T1	T2	T3
Corn	64	64	64
Soybean	27.4	27.4	27.4
Canola oil	0	2%	4%
Starch	3.74	3.74	3.74
Wheat bran	1	1	1
DL-Methionine	0	0	0
Lysine	0	0	0
DCP	1.13	1.13	1.13
Oyster	1.5	1.5	1.5
Vitamin	0.25	0.25	0.25
Mineral	0.25	0.25	0.25
Salt	0.25	0.25	0.25
Coccidiostat	0.15	0.15	0.15
Sand	0.33	0.33	0.33
	100	100	100
Calculated nutrient content			
ME kcal/kg	2920	2920	2920
CP (%)	18.2	18.2	18.2
Calcium (%)	0.9	0.9	0.9
Available P (%)	0.35	0.35	0.35
ME/CP	160.1	160.8	160.7
Ca/P	2.5	2.5	2.5

1: Vitamin content of diets provided per kilogram of diet: vitamin A, D, E and K. 2: Composition of mineral premix provided as follows per kilogram of premix: Mn, 120,000mg; Zn, 80,000mg; Fe, 90,000mg; Cu, 15,000mg; I, 1,600mg; Se, 500mg; Co, 600mg

Statistical analyses: Data were analyzed in a complete randomized design using the GLM procedure of SAS (2000) version 12:

$$Y_{ij} = \mu + \alpha_i + \varepsilon_{ij}$$

Where:

Y_{ij} = All dependent variable

μ = Overall mean

α_i = The fixes effect of CO levels ($i = 1, 2, 3$)

ε_{ij} = The random effect of residual

Duncan multiple ranges used to compare means.

Table3:Percentage composition of experimental diet in finisher period

Ingredient	Experimental diets		
	T1	T2	T3
Corn	66.5	66.5	66.5
Soybean	24.1	24.1	24.1
Canola oil	0	2%	4%
Starch	3.81	3.81	3.81
Wheat bran	0	0	0
DL-Methionine	0.44	0.44	0.44
Lysine	0.043	0.043	0.043
DCP	0.89	0.92	0.89
Oyster	1.38	1.36	1.31
Vitamin	0.25	0.25	0.25
Mineral	0.25	0.25	0.25
Salt	0.25	0.25	0.25
Coccidiostat	0.15	0.15	0.15
Sand	1.937	1.937	1.937
	100	100	100
Calculated nutrient content			
ME kcal/kg	2920	2920	2920
CP (%)	16.5	16.5	16.5
Calcium (%)	0.8	0.8	0.8
Available P (%)	0.3	0.3	0.3
ME/CP	176.8	176.4	176.6
Ca/P	2.6	2.6	2.6

1:Vitamin content of diets provided per kilogram of diet: vitamin A, D, E and K.2: Composition of mineral premix provided as follows per kilogram of premix: Mn, 120,000mg; Zn, 80,000mg; Fe, 90,000mg; Cu, 15,000mg; I, 1,600mg; Se, 500mg; Co, 600mg

RESULTS AND DISCUSSION

Carcass weight: Results for carcass weight shown in Table 4. Result shows that with usage high levels of canola oil in experimental diet (T3 = 4% canola oil and T2 = 2% canola oil, respectively) significantly increase the carcass, breasts and thighs ($p < 0.0001$) in relationship to basal diet, as the 3 treatment include of 4% canola oil has a highest effects, while chilled carcass weight for control diet (T1 = without canola oil) 82.76 reached to 93.89 and 112.33 for T2 (2% canola oil) and T3 (4% canola oil), respectively and breasts weight for control diet (T1 = without of canola oil) 9.33 reached to 13.54 and 21.99 for T2 (2% canola oil) and T3 (4% canola oil), respectively and thigh weight for control diet (T1 = without of canola oil) 17.78 reached to 19.88 and 25.12 for T2 (2% canola oil) and T3 (4% canola oil), respectively. In he some experiments, it has showed the presence of canola oil in diets improved the meat yield and carcass weight (beasts and thigh) in broiler [5 and 17] but not the similar research about Japanese quail in this subject, and this experimental is an initiatory research. These finding is an according with this study finding. Whitherward these researchers has reported the presence of canola oil in diets improved the feed intake and feed conversion ratio in the broiler chicks, so it has seem the carcass weight in relationship whit the improvement of feed intake and feed conversion ratio in broiler, but not the similar reports about Japanese quail in this subject. This finding is an according with finding of Fouladi *et al* (2008) about broiler chicks. Talebali and Farzinpour (2005) it has reported the canola seed increase the carcass and breast weight in the broilers; they were give this effect on the high levels of oil in canola seed. It has seem the canola oil have very

high monounsaturated fat; contain intermediate amounts of the precursor omega-6 and omega-3 polyunsaturated fatty acids Linoleic Acid (LA) and Alpha Linolenic Acid (ALA) respectively and is very low in saturated fat. Canola oil as a good contains significant amounts of vitamin E and phytosterols. So it has seem the canola oil improved the depositions of the good fat in the tissue, then this subject need to the another research about this project.

Table 4: Least square means for carcass, breast and thigh weight

	Treatment				
	T1	T2	T3	SEM	P>F
Carcass weight	82.76b	93.89a	112.33a	8.678899	0.0001
Breast weight	9.33c	13.54b	21.99a	0.385765	0.0001
Thigh weight	17.78c	19.88ab	25.12ab	0.484659	0.0001

Table 5: Least square means for internal organs weight

	Treatment				
	T1	T2	T3	SEM	P>F
Liver weight	1.6044b	1.6832b	1.87a	0.11344	0.0001
Spleen weight	0.0765ab	0.0766b	0.0765a	0.02522	0.0001
Heart weight	0.4021bc	0.413	0.444	0.05455	0.0001
Gizzard weight	2.0031a	2.0101a	2.0223a	0.13671	0.0132
Proventriculus weight	0.35141a	0.42766b	0.56344c	0.06773	0.0222
Abdominal fat	140.00a	106.32b	90.72c	9.35598	0.0001

Internal organs weight: Result for internal organs weight shown Table 5. Result shown that with usage high levels of canola oil in experimental diet (T3 = 4% canola oil and T2 = 2% canola oil, respectively) significantly increase the livers weight ($p < 0.0001$) in relationship to basal diet, as the 3 treatment include of 4% canola oil has highest effects and too result shown that with usage high levels of canola oil in experimental diet (T3 = 4% canola oil and T2 = canola oil, respectively) numerically increase gizzard and heart weight, respectively but not significantly. Spleen weight not affected with the experimental diets. Result showed canola oil in levels of 4% and 2% (T3 and T2, respectively) significantly decrease the abdominal fat deposition ($p < 0.0001$) in relationship to basal diet, as the 3 treatment include of 4% canola oil has a highest effects. Proventriculus weight is significantly affected with the different levels of canola oil in all treatments.

In the some experiment, it has showed the presence of fat in the diet decrease the livers spleens a in the broilers chicks [12 and 26] and some researchers report in their studies, the consumption different levels of fat in broiler diets has no affected on the livers and spleen weights [14 and 28] but not the similar research about Japanese quail in this subject, and this experimental is an initiatory research. These finding is an according with this study finding. But many researchers it has shown the consumption different levels of fat in broiler diets significantly increase livers and spleen weight in the broiler chickens, therefore the increase of the liver action for the high levels of fat metabolism [21], so the last researches corroborant the present study, as the canola oil has increase the liver weight in broiler chicks. Peres and Maldonaldo (2001) has shown the consumption of different levels of canola seed in broiler diets, increase the heart and gizzards weight in broiler chicks. Those researchers give recognize these finding in relationship in afar

the heart. These finding in corresponding with our study because the canola oil can be numerically increase the hearts weight in this research but no significantly.

In the many of research proventriculus weight not measured, according no that the good references about the effects of fats on the proventriculus weights and size, but in this study it has showed that with usage high levels of canola oil in experimental diet (T3 = 4% canola oil and T2 = canola oil, respectively) significantly increase proventriculus in the Japanese quail. The primary objective of the present trial was to evaluate if dietary Linoleic Acids (LA) supplementation use in diet, decrease significantly abdominal fats. In a recent study shown that with usage high levels of canola oil in experimental diets (T3 = 3% canola oil and T2 = 2% canola oil, respectively) significantly increase abdominal fats respectively in Japanese quail since the canola oil has an excellent source of linoleic acid

CONCLUSION

Canola oil, increase the chilled carcass weight, breasts, thighs, livers weight, But canola oil in the all of the treatment not affected on the gizzards, spleens and hearts weight in the Japanese quail. In the other hand canola oil decrease the abdominal fat deposition in the Japanese quail.

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