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Effect of Replacing Dietary Levels of Soybean Meal with Canola Meal in Japanese Quail

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ABSTRACT

The present study was conducted to study the effect of replacing soybean meal with canola meal in rations fed to Japanese quails. Two hundred and sixteen, day–old quail chicks were randomly divided into six groups of 36 quails each. Then each group was further sub-divided into three replicates of 12 quails each. Six isocaloric and isonitrogenous rations A, B, C, D, E and F containing 0, 10, 15, 20, 25 and 30% of canola meal, respectively were fed for 42 days. Weekly weight gain and daily feed consumption was recorded. Maximum weight gain (165 g), feed efficiency (2.42), (2.47) and dressing percentage (68.6%) and (68.6%) was observed in quail fed on ration A and C containing 0 and 15% canola meal, respectively. Minimum weight gain (142 g), poor feed efficiency (2.67 g) and lowest dressing percentage (56.4 g) were observed in chicks fed on ration F containing 30% canola meal. Moreover, weight of thyroid gland was not affected by the inclusion levels of canola meal in the diet. It was concluded that canola meal could be successfully incorporated in quails rations upto 15% without any effect on the performance of quails. The study also indicated that rations containing canola meal were comparatively cheaper and cost per kilogram of live weight was decreased and net profit per quail was increased.

Key Words: Quail; Diet; Soybean; Canola

INTRODUCTION

In Pakistan poultry industry has developed much during last two decades. In order to rear chickens for meat purpose, a huge capital is required in term of shelter, feed, vaccine, medication etc. where as quail farming requires less capital as well as shelter, feed, vaccination and medication. Among all these factors feed amounts to about 70% of total cost of production. So important factor is to produce most economical poultry production through balanced and cost effective ration. Where as quail farming in our home land is becoming a popular business, considered to be more profitable, many small farmers are switching over to quail farming. With small initial investment, one can start a quail farm either in specific location or in his house. Dressed quail meat fetches a reasonable market price ranging from Rs.14 to 25 per bird. Steam roasted are precious item of hotels and restaurants, because quail meat has a definite game bird flavour and reputed to be very tasty tender and delicious with high calorific and low cholesterol value.

To obtain accurate results, it is necessary to formulate balanced ration. The major components of feed are energy and protein. The amount of feed intake by quails depends upon the metabolizable energy (ME) content in diet, age of bird, its reproductive status and ambient temperature.

Canola is the seed of *Brassica napus* or *Brassica compestris* species. The oil components of canola seed contains less than 2% erucic acid and solid component of seed contain less than 30 micro mol of glucosinolates/g of air dry oil free solid (Campbell, 1987). This development has resulted in increased usage of canola meal in poultry ration. It has 36% protein, which is a high quality protein for various classes of poultry. Canola meal is possible source of protein which can replace soybean meal. The present project was therefore planned to study the: 1) Nutritional evaluation of canola meal as a vegetable protein source, 2) Canola meal as a substitute for soybean meal in quail ration, 3) Optimum inclusion level of canola meal in quail diet, 4) Cost effectiveness of canola meal

MATERIALS AND METHODS

Procurement of ingredients. Ingredients used in ration such as corn, rice tips, rice polish, corn gluten 60%, canola meal, soybean meal, soybean oil, molasses, DCP, limestone, vitamin+mineral premix were purchased from Big Feed Industry, Lahore whereas animal protein sources (fish meal and poultry by product meal) were donated by Punjab Feed Industry, Sheikhupura.

Preparation of rations. Six isocaloric and isonitrogenous rations were prepared and designated as A, B, C, D, E and F (Table I & II). The replacing levels of canola meal against soybean meal were as 0, 10, 15, 20, 25 and 30%, respectively. Group A served as control.

Table I. Composition of quail ration

Ingredients	A	B	C	D	E	F
Corn	13	13	13	13	13	13
Rice tips	30	29	29	28	26	24.5
Rice Polish	8	8	8	9	11	13
Soybean Meal	30	20	15	10	5	0
Canola Meal	0	10	15	20	25	30
Fish meal	5.5	5.5	5.5	5.5	5.5	5.5
Corn Gluten 60%	2	3	3.27	3.75	4.23	4.47
P.B.P. Meal	3.5	3.5	3.5	3.5	3.5	3.5
DCP	0.38	0.3	0	0	0	0
L/S	1	1	1	1	0.75	0.75
Molasses	5	4.5	4.5	4	3.75	3
Oil	1	1.5	1.5	1.5	1.5	1.5
Methionine	0.12	0.12	0.1	0.09	0.08	0.07
Lysine	0	0.08	0.13	0.16	0.19	0.21
Premix	0.5	0.5	0.5	0.5	0.5	0.5
Chemical composition						
CP %	24	24	24	24	24	24
ME K.cal/Kg	2900	2900	2900	2900	2900	2900
Lysine	1.3	1.3	1.3	1.3	1.3	1.3
Methionine	0.5	0.5	0.5	0.5	0.5	0.5
Methionine + Cyst	0.75	0.75	0.75	0.75	0.75	0.75
CF	3.6	4.1	4.4	4.6	5.0	5.3
Ca	0.8	0.8	0.8	0.8	0.8	0.8
Available P	0.3	0.3	0.3	0.3	0.3	0.3

Source: Nutrient Requirement of Poultry (NRC, 1994)

Procurement of quail chicks and start of experiment. The experiment was conducted at Animal Nutrition Section, College of Veterinary Sciences, Lahore. Two hundred and sixteen day old quail chicks (*Coturnix-coturnix japonica*) male and female mixed were purchased from local hatchery. Chicks were randomly divided into six groups of 36 birds and each group was further sub-divided into three replicates, 12 bird each. The birds were reared in quail batteries throughout the experiment. Temperature was maintained at 95°F during the 1st week and was decreased 5°F every coming week till it reached 85°F. Continuous light, fresh and clean water and feed was provided *ad libitum* throughout the experiment. Chicks were weighed before the start of experiment and daily feed offered and health record of chicks were maintained. The feed refused and body weight at the end of each week was recorded to observe the weekly weight gain, feed consumption and feed conversion ratio. The experiment was planned according to the complete randomized design (CRD). The data thus collected were subjected to statistical analysis (Steel & Torrie, 1980). The data was collected according to following parameters: Initial body weight, Weekly feed consumption, Weekly body weight, Feed conversion ratio, Final body weight, Dressing percentage, Weight of thyroid gland and Economics.

Table II. Vitamin + mineral premix

Minerals	
Calcium %	0.8
Available phosphorus %	0.3
Sodium %	0.2
Copper (mg)	8
Manganese (mg)	80
Iron (mg)	100
Zinc (mg)	80
Iodine (mg)	0.6
Selenium (mg)	0.5
Vitamins:	
Vitamin A (IU)	8000
Vitamin D3 (KU)	1200
Vitamin E (IU)	50
Vitamin K (mg)	3
Vitamin B12 (mg)	.005
Thiamine (mg)	4
Riboflavin (mg)	6
Niacin (mg)	60
Pantothanic acid (mg)	50
Pyridoxine (mg)	6
Folic Acid (mg)	1
Choline (mg)	3000
Amino acids	
Lysine %	1.3
Methionine %	0.5
Methionine + Cystine	0.75

RESULTS AND DISCUSSION

Weight gain. On an average the chicks on diet containing 15% canola meal and 15% soybean gained highest weight gain i.e. 165 g (Table III), whereas chicks on diet containing 30% canola meal gained least weight gain (142 g). Ration A (as control diet) gained the same weight as in Ration C (15% SBM+15% - canola meal) while chicks on diet B containing 10% canola meal and 20% soybean meal gained weight 163 g. Present results indicated that quail chicks gained better weight on ration containing 15% canola meal. Ijaz (1997) also reported that canola meal can be incorporated in broiler diets upto levels of 12% without impairing performance of broilers. Almost similar response was observed by Idrees (1998) who reported that canola meal at 15% level in diet did not produce adverse effects on growth rate.

Feed consumption. The total feed consumption of chicks fed on ration C containing 15% canola meal and 15% soybean meal was highest (409 g) (Table III) and that fed on ration F containing 30% canola meal was least (380 g). These results are in conformity with Summers *et al*. (1988) who reported that feed intake decreased ($P<0.01$) with the canola meal diets. While in another study by Nassar *et al*. (1985) who concluded that daily feed intake was decreased

significantly when all the protein was supplied by canola meal. In another study, Summers *et al.* (1988) reported that feed intake was decreased with canola meal diets.

Feed conversion ratio. The cumulative feed conversion ratio of chicks fed on ration F (30% canola meal) was the poor and that fed on ration A (control diet) was the best (Table III). These results corroborate the findings of Salmon (1982) who reported that canola meal reduces feed conversion ratio. Almost similar study was conducted by Arena and Penz (1990) who reported that feed conversion ratio were significantly lower in chickens given 30% rapeseed meal than in other groups.

Table III. Weight gain, feed consumption, feed efficiency, dressing percentage and weight of thyroid glands (0-6 weeks)

Description	A	B	C	D	E	F
Weight gain (g)	165	163	165	158	147	142
Feed consumption (g)	400	393	409	403	390	380
Feed Efficiency	2.42	2.41	2.47	2.55	2.65	2.67
Dressing percentage	68.6	68.2	68.6	62.4	58.4	56.4
Weight of thyroid glands (as % of body weight)	.055	.056	.055	.055	.061	.059

Dressing percentage. Dressing percentage of chicks fed on ration C containing canola meal and 15% was highest and that fed on ration F containing 30% canola meal was least. Significant difference among dressing percentage of quails fed on different experimental rations was observed (Table III).

Thyroid gland weight. Weight of thyroid gland of the chicks fed on ration E containing 25% canola meal was highest among all other groups. Non-significant difference in the weights of thyroid gland was observed among the quail chicks fed on rations containing (0, 10, 15, 20, 25 and 30%) levels of canola meal. Almost similar findings were reported by Javed *et al.* (1999) who studied the effect of different levels of rapeseed meal in broiler. It was concluded that the thyroid gland did not differ among the groups (Table III).

CONCLUSION

Present study indicated that Ration "C" containing 15% canola meal and 15% soybean meal under local conditions gave better weight gain, feed efficiency and dressing percentage and was the economical. But higher amounts of canola meal were used in diets (20, 25 and 30%) did not showed good results. It is pertinent to mention here that presence of intrinsic antinutrient factors like glucosinolate still found in canola meal in a minute amount may impair the performance, while higher percentage of fiber may also effect when higher levels of canola meal are included in diet.

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