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Efficiency of Canol Meal in Broiler Ration

G. M. Baloch, A. A. Solangi, M. P. Wagan and M. Tahira
Department of Animal Nutrition, Faculty of Animal Husbandry and Veterinary Sciences, Sindh Agriculture University Tandojam, Pakistan

Abstract: To evaluate the efficiency of Canol meal on grwoth performance of Broiler, an experimental study was carried out at the Poultry Experiment Station, Department of Animal Nutrition, Sindh Agriculture University, Tandojam during May-June 2001. 200 Arboracer broilers were equally arranged as T_1, T_2 T_3, T_4 and T_5 fed with the rations containing 0, 10, 15, 20 and 25% canola meal, respectively. The rations were formulated according to indigenous farming system of Pakistna. Five Iso-nitrogenous and Iso-calroic rations were prepared at a level of 20% CP and 3000 Kcl/Kg energy, with a view to establish the optimum level of canola meal in the broiler ration. The average weight gain in T_1, T_2, T_3, T_4 and T_5 was 1772.97, 1789.80, 1811.13, 1921.78 and 1882.69g, dressing % 61.77, 61.44, 60.85, 62.99 and 62.75, feed consumption was 3923.42,3933.13, 3887.45, 3985.29 and 3882.18g and feed efficiency 2.21, 2.19, 2.14, 2.07 and 2.06 respectively. For these paramenters T4 was significantly ($P<0.01$) superior over rest of the treatments. No significant differences were observed among the groups for internal organs i.e., liver, heart and gizzard weight. The study concludes that broiler ration with 20% canola meal proved more beneficial and economical.

Key words: Canol meal, broiler and ration

Introduction

The feed milling industry in Pakistan has undergone rapid expansion and compound feed industry constantly faces the challenge of securing the production and supply of nutrients to meet current need and performance requirements. They must also develop in the most cost-effective manners. High quality protein meals are costly and often in short supply and this forces nutritionists to use low priced protein meals often without fully considering their quality aspects or nutrient availability. Competition among feed mills results in a squeeze of profit margins that puts further pressure on nutritionists to reduce the production (Anonymous, 2000).

The basic requirement for the poultry production in fundamental nutrients like protein and energy the quality of protein mainly depends upon the composition and bio-availability of essential amino acids to the birds. High quality protein meals are costly and often in short supply due to this reason nutritionists suggest to use low priced protein meals. The use of feed stuffs is rather limited due to commercial, economical and nutritional liimitations, the use of less expensive protein meals can protentially reduce feed costs and give reasonable performance if formulated accurately, so ingredients price, source of availability, nutritional profile, inclusion levels, anti-nutritional factors, palatability and their effects on animal performance must all be considered while formulating poultry rations (Anonymous, 1994).

There are two types of protein required for poultry production i.e. animal protein and vegetable protein. Animal protein sources are fish meal, blood meal, meat meal and feather meal, while vegetable protein sources are cereals, oil crops and legumes crops. No doubt, the superiority of the animal protein over vegetable protein is established due to its better amino acid profile. But now-a-days due to high cost and scarcity of animal protein sources and coupled with the un-scientific methods of their preparation limit, adulteration of these factors give negatifve effect on growth FCR, mortality (Anonymous, 1994).

Moreover, the plant protein sources have now become expensive due to the lower production because of un-congenital, ecological and the environmental conditions presently facing our agriculture sector. Some good sources of vegetable protein are generally through the meals of different traiditional and non-traditional oil seed crops, like seasame, linseed, sunflower, soybean etc. Sunflower and soybean cultivation hit our main crop that is cotton because these crops are sown in the same season i.e. kharif. Due to limited sources of agriculture the cotton crop is already disturbed and is a threatening to our national economy (Anonymous, 1994).

Canola is a newly introduced oil seed crop and sown in Rabi season. It belongs to the family Brassica, that is Brassica napus or the Brassica compestris species. Moreover the oil components

contain > 2% erucic acid and solid component of seed contain > 30 micro moles of glucosinolates per gram of air dry (Canol Council of Canada, 1987 (CCC) and Campbell, 1988). Canola is an improved variety of rape mustard seed (>2% erucic acid, >30 mole of glucosinolate) which has been developed through plant breeding by the Canadian Scientistis (Thomas, 1986). This improved variety of rapeseed is called "double low" or "00" or Canola. "00" qualities of rape are defined actually within the EU as rapeseeds with contents in total glucosinolates > 25 µm 01/g, one "Zero" refers to this. This second "Zero" refers the reduced erucic acid contents, not important in meal. The first "00" rapeseed was released for commercial production in 1974. The name canola was first trade mark registered with canola Council of Canada (CCC) in 1980. The major producers of canola are China, India, Germany, Canada and Japan (Anonymous, 1994).

In Pakistan, canola has been introduced by the Barani Agriculture Research and Development Program (BARD) of Pakistan Agriculture Research Council (PARC) with technical collaboration of Canadian International Development Agency (CIDA), where preliminary studies have established its success as an oil seed crop (Anonymous, 1995). During Rabi 1988-89 season a total of 275 acres of "Westar" (Canola origin) were seeded at NARC, Margala, Fateh Jang, Sehng and Swat valley. Now canola meal is abundantly available in Pakistan, as an oil seed industry by-product and the Government of Pakistan has emphaszied on its progagation, as its oil quality is the best than other vegetable oils (Anonymous, 1995).

Taking into consideration the conditions above stated in preparation of poultry ration, different levels of canola meal were tried to evaluate the efficiency of poultry production.

Materials and Methods

200 day-old Arboracer broiler chicks were studied to evaluate the production performance of broilers fed on canola meal supplemented ration in varying proportions. The chicks were divided as T_1, T_2, T_3, T_4 and T_5 fed with the rations containing 0, 10, 15, 20 and 25% canola meal, respectively.

Space: the space for each group was 40 sq. ft. i.e. 5' x 8' (40 sq. ft), initially 0.5 sq. ft. per bird, 1-running inch drinking space per bird and 2 running inch-feeding space perbird was given to each group. Round drinkers and round feeders were used for drinking and feeding the birds. The feeding space was extended upto 2.5 inch per bird as feeding and drinking space and the similar space was continued upto the end of the experiment i.e. 6 weeks.

Brooding Temperature: As the experiment was conducted during the month of May-June 2001, therefore, the required temperature of brooding was already available in poultry house and in the atmosphere, so no additional brooders were used for brooding purpose.

Lightening: 24 hrs light was supplied in the shed.

Litter: Wood husk was used as the litter for rearing the chicks.

Fumigation: Formaldehyde and Potassium permanganent at the ratio of 2:1 was used for fumigation of the shed.

Rations: The birds under study were offered feed and water and other things ad libitum. Five Iso-caloric, Iso-nitrogeneous rations viz, T_1, T_2, T_3, T_4 and T_5 were prepared having different levels of canola meal viz, 0, 10, 15, 20 and 25%. The compuotation of ration was carried out at a level of 20% C. P., 3000 Kcl/kg energy.

Feeding: In the first week feed given twice a day i.e. early morning at 7 a.m. and in the evening 6 p.m. Later on, the 3rd week the programme was revised that continued upto the end of the experiment i.e. 6 weeks, in the revised programme feed was given 3 times in 24 hrs i.e. 7 a.m. in the morning and 4.30 p.m. in th eevening and 1 p.m. in the night.

Vaccination Schedule: In this first vaccination new castle disease was given on 5th day of age followed by I. B. D. (Gumboro) after 3 days i.e. at the age of 8th day. Vaccination was done by eye or nasal dropping.

Antibiotics and Multivitamins: Erythro FZ antibiotics and Vitasole super vitamins.

Methods: The experiment was laid out in randomized system at the Department of animal Nutrition, Faculty of Animal Husbandry & Veterinary Sciences, Sindh Agriculture University, Tandojam, Tandojam during the months of May-June 2001.

Housing and Management: The chicks were keppt on deep litter system. Before releasing

the bird, the shed was completely made up-to-date then fumigated with formuladehyde and potassium permanganate at the ratio of 2:1. The shed was then closed completely and made airtight for 48 hrs. After 48 hrs of fumigation the shed was opened to release the gases and for putting the chicks. A total of 200 straight run chicks of Arboracers breed were selected for the experiment.

Composition of Rations (%)

Ingredients	T_1	T_2	T_3	T_4	T_5
Canola	0	10	15	20	25
Rice Broen	41	33	31	28	28
Yellow Corn Grain	25	25	25	24	22
Cotton Seed meal	05	04	04	04	04
Guar Meal	05	05	05	05	05
Meat Meal	05	05	05	05	04
Blood Meal	04	03	03	02	02
Fish Meal	12	10	07	05	03
Bone Fish	0	02	02	02	02
Animal Fat	-	-	-	02	02
Molasses	03	03	03	03	03
Total	100	100	100	100	100

Nutrition Composition of the Rations

Nutrients	Rations				
	T_1	T_2	T_3	T_4	T_5
Crude Protein %	20.5	20.7	20.5	20.1	20
Me (Keal/Kg)	3148	3001.5	29.48	2983	2926
Calcium %	1.11	1.22	1.46	1.38	1.24
A.V. Phosphorus %	0.75	0.95	0.84	0.78	0.77
Lysine %	1.35	1.15	1.56	1.09	1.09
Methionine %	0.38	0.39	0.38	0.38	0.37
Crude Fiber %	2.34	3.32	3.87	4.39	4.9

Parameters Meausred: At the end of the experiment i.e. at the age of 0-6 weeks, 0-5 birds from each group were randomly picked up weight of each bird was noted, after which the birds were slaughtered to record the following slaughtering data and results of the experiment for statistical analysis.

* Initial body weight
* Weight of the live bird
* Feed consumption
* Feed Efficiency (FCR)
* Dressing percentage
* Weight of giblets
  Liver
  Gizzard
  Heart
* Mortality % age
* Net profit/bird

The data was statistically analyzed by analysis of variance technique and comparison of mean differences was made by LSD test using MSTAT-C computer package as per the statistical methods developed by Gomez and Gomez (1984).

Results and Discussion

Weight Gain: Weight gain on avaerage for birds fed on rations T_1, T_2, T_3, T_4 and T_5 were 1772.97, 1789.80, 1811.13, 1921.78 and 1882.69, respectively (Table 1), nutritionally the birds of group "T_4" showed superiority over the birds of groups T_5, T_3, T_2 and T1 in descending order. These results demonstrated that with each increased level of canola meal in combination with the self-prepared feed, the weight gain was significantly improved. The data when subjected to statistical analysis showed highly significant ($P<0.01$) difference in weight gain among different groups of brids fed on various experimental rations. The results of the present study are further confirmed by the finding of Goh *et al.* (1982), Clandinin and Roblec (1983) and Saterby and Elwinger (1986) concluded that 20% canola meal in rations for various classes of poultry was nutritionally better and ecnomical, while Earnest *et al.* (2000) recommended 25% canola meal for economical broiler production.

Feed Consumption: Average feed consumed by the broilers fed on different experimental rations T_1, T_2, T_3, T_4 and T_5 was 3923.42, 3933.13, 3887.45, 3985.29 and 3882.18g, respectively. Birds in groups "T_5" (25% canola meal), consumed comparatively leasser amount of feed i.e. 3882.10g followed by the broilers in groups T_3 (3887.45g). The birds in grdup "T_4" (20% canola meal) consumed maximum amount of feed (3985.29), while the birds in group "T_2" (10% canola meal) and group T_1 (0% canola meal) consumed feed 3933.13 and 3923.42g respectigvely. Differences in feed consumed by the chicks of different groups fed on rations containing varying levels of canola meal as well as control were significant ($P<0.01$). LSD teset revealed hihgly significant ($P<0.01$) differences in average feed consumed by birds between groups T4 as compared to rest of the treatments. The results reported by Blair and Misir (1989), Westcherek *et al.* (1990) and Lee *et al* (1991), are well comparable to the present findings, who concluded that rapeseed oil meal upto 20% could be included in broiler diets without affecting the performance.

Total Feed Conversion Efficiency: Feed conversion ratio (feed efficiency) of birds fed on rations T_1, T_2, T_3, T_4 and T_5 was 2.21, 2.19, 2.14, 2.07 and 2.06 respectively (Table 1). Birds fed on ration T_4 were most efficient in feed conversion

Table 1: Production performance of Arboracer Broiler in Response to Canola Meal Supplementation

Canola meal proportion	Feed consumption/ bird (g)	Weight gain/bird (G)	F. C. R.	Dressing % age	Weight of Internal Edible parts (g)			Mortality Rate (%)	Net Profit/ bird (Rs)
					Liver	Heart	Gizzard		
T_1 0% (Control)	3923.42b	1772.97e	2.21a	61.77b	48.50	9.31	38.89	12.00	20.47
T_2 10%	3933.13b	1789.80d	2.19b	61.44b	48.79	9.45	38.85	8.00	20.39
T_3 15%	3887.45c	1811.13c	2.14c	60.85c	48.84	9.54	38.80	6.00	25.76
T_4 20%	3985.29a	1921.78a	2.07d	62.99a	48.90	9.54	38.72	4.00	27.62
T_5 25%	3882.18c	1882.69b	2.06d	62.75a	50.21	9.82	38.60	2.00	27.45
P value	0.001	0.001	0.001	0.01	0.10	-	-	-	-
F value	82.50	245.92	151.326	43.61	1.646	0.244	0.033	-	-

as compared to others i.e. T_1, T_2 and T_3 the chicks in group "T_5" (25% canola meal) closely followed T_4. Each increased level of canola meal in the self prepared feed, linearly affected feed efficiency. Statistically, highly significant ($P<0.01$) differences were observed for feed conversion ratio in different groups. L. S. D. Test revealed that broilers in group "T_4" (20% canola meal) were significantly better in feed conversion efficiency compared to broilers of other groups including the control. Thus, nutritionally 20% canola meal ("T_4") proved to be most beneficial for achieving better feed efficiency. The findings of Cermak *et al.* (1996) and Ernest *et al.* (2000) are in support of the present results, who were of the experience that feed conversion efficiency in diets containing canola meal upto 25% was better than the control.

Average Dressing Percentage: The dressing percentage averaged 61.77, 61.44, 60.85, 62.99 and 62.75 in groups T_1, T_2, T_3, T_4 and T_5 respectively (Table 1). Significantly maximum dressing %age was observed in birds fed on ration with 20% canola meal (62.99), while the minimum in T3 (60.85%) with 15% canola meal. The birds in group T5 (25% canola meal) closely followed group "T_4" (62.75%). The LSD test indicated that the broilers in group "T_4" (20% canola meal) produced significantly greater dressing percentage as compared to the birds in other groups as well as control. The differences were, however, significant with varied levels of significance between groups where canola meal was added except group T_4 (20% canola meal) and group T_5 (25% canola meal), where non-significant difference were recorded. Thus, nutritionally 20% canola meal (group T_4) proved to be most advantageous. The present results were in contrast to those of Cermak *et al.* (1996) who obtained non-significant dressing percentage with rapeseed cake in diets of broilers.

Weight of Edible Internal Organs (Liver, Heart, Gizzard): The results revealed that liver weight of broilers in groups T_1, T_2, T_3, T_4 and T_5 was 48.50, 48.79, 48.84, 48.90 and 50.21g, heart weight 9.31, 9.45, 9.54, 9.64 and 9.82g and gizzard weight 38.89, 38.85, 38.80, 38.72 and 38.60g respectively. The statistical analysis illustrated non-significant differences among the weights of liver, heart and gizzard recorded from the broilers fed on varied levels of canola meal. Similar results have been reported by Wetscherek *et al.* (1990) Lee *et al.* (1991), Cermak *et al.* (1996) and Gomes *et al.* (1998) they all were of the experience that canola meal being a low cholesterol ingredient did not have any negative effect on the internal edible organs of the broilers.

Mortality Rate: The mortality rate in groups T1, T2, T3, T4 and T54 were 12, 08, 08, 04 and 02% respectively. The mortality rate of broilers during six weeks fed on ration containing each increased canola meal reduced moratlity rate and the lowest mortality (2%) was recorded under control (0% canola meal) had 12% mortality.

Economics: The e of the rations added in different level of canola meal as compared to control was also worked out (Table 1). The cost per kilogram live broiler weight was 59.27, 60.11, 55, 73, 58.82 and 57.24 rupees in groups T_1, T_2, T_3, T_4 and T_5 respectively, while the broilers were sold at the live weight rate of 45 rupees per kg. Thus, considerable not profit was achieved and the chicks in group "T_4" (20% canola meal) realized maximum net profit (Rs. 27.62), group T_5 (25% canola meal) closely followed the T_4 group with Rs. 27.45, while the net profit was decreased considerably in group T_1 and T_2 thus 20% canola meal proved to be the most economical.

Conclusion

The following conclusions could be drawn from the present study:

* The canola meal is not of the best sources of vegetetable protein.
* 20% canola meal showed most economical results without any adverse effect on the growth and feed efficiency of the bird.
* Canola meal being a good profile of amino acid gives the better FCR (Feed conversion Ratio) and reduces the cost of production.
* More profit and less mortality was recorded in comparison to animal protein i.e. Figh meal.
* It is an excellent substitute of soybean meal and fish meal for use in broiler diets and it can replace the soybean meal.
* This might be a good profile of amino acid and the fact that canola meal had lower Glucosinolate contents, which is the main toxic factor responsible for chicks growth inhibition.

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