

Efficiency of Sunflower Meal in Relation to Growth of Broilers

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Abstract: Six weeks study was conducted to evaluate efficiency of sunflower meal (SM) in self prepared feed on the growth performance of the broilers. Group A was reared as control (0% SM), while B, C, D and E (50 chicks in each group) fed with rations containing 5, 7, 9 and 11% SM. Groups A, B, C, D and E had mean weight gain of 1629.49, 1723.66, 1831.50, 1882.32 and 1876.18 g, feed consumption 3756.80, 3766.80, 3774.14, 3771.90 and 3774.90 g, feed efficiency 2.31, 2.18, 2.06, 2.00 and 2.01, dressing percentage 56.38, 57.92, 60.32, 62.64 and 62.29. Weight of edible parts remained somewhat unaffected. Group D (9% SM) proved economical with greater weight gain (1882.32 g), feed consumption (3771.90 g), feed efficiency (2.00), dressing percentage 62.64.

Key words: Broilers, sunflower meal, growth

Introduction

Generally, the major sources of nutrients in broiler feeds are grains, oilseed meals, meat packing by-products, fish meal and by-products of the processing of grains for human consumption, such as wheat, rice and corn-milling by-products (Schaible, 1976). Nutritional science has taken much of the uncertainty out of this, so that feeds are now formulated in such a manner that they produce economical gains. The unprecedented spread of intensive poultry over the world has been in accompaniment of other striking changes in world agriculture. The so-called green revolution has led to tremendous increases in agricultural production of grains and oilseed crops throughout the world. This has made feed crops available to form the basis of poultry rations so that these crops can be transformed into eggs and poultry meat, two prized forms of animal protein in economically developed and developing areas of the world (Schaible, 1976). In some parts of the world sunflower meal represents important source of protein, and it is known that sunflower is the second most important source of vegetable oil in the world after soybeans. Eastern Europe and Russia produce about 65 percent of the world total. This protein source is lysine deficient. The sunflower meal may be rather high in fiber and low in metabolizable energy value unless special processing procedures are used to remove the seed hulls from the meal (Nesheim *et al.*, 1982).

Sunflower meal usually contains 43 percent protein, 1760 kcal/kg metabolizable energy (deficient variably in lysine and methionine depending on maturity of seed at harvest), 2.8 percent fat, 14 percent crude fiber, 0.4 percent calcium, 0.3 percent available phosphorus, 1.65 percent methionine, 0.4 percent cystine, 1.7 percent lysine, 0.5 percent tryptophan and 3.5 percent arginine. Sunflower seeds are not ordinarily used to any extent in poultry feeding because of very high fibre content and are usually expensive. Tests made of the value of sunflower seeds grown in England for poultry feed, found them entirely satisfactory and an excellent substitute for cereal grains. The seeds were quite digestible, gave more energy than the cereals on an equal weight basis, and were palatable when fed to the flock under competitive conditions (Nesheim *et al.*, 1982). This study was conducted to evaluate efficiency of sunflower meal added in self prepared feed on the growth performance of the broiler.

Materials and Methods

This experiment was conducted at Sindh Agriculture University, Tandojam during July-August, 1999. Two hundred and fifty (250) day-old broiler chicks were individually weighed at start of the experiment. To accommodate the flock, a shed was prepared hygienically. The chicks were divided at random into five groups

i.e. A, B, C, D and E, each having 50 chicks. Sunflower meal (SM) was added in the self prepared broiler feed @ 0, 5, 7, 9 and 11%

Table 1: Composition of starter ration (%)

Ingredients	A	B	C	D	E
	Ration	Ration	Ration	Ration	Ration
Sunflower meal	0.00	5.00	7.00	9.00	11.00
Rice broken	50.00	50.00	50.00	50.00	50.00
Rice polish	4.00	4.00	2.00	2.00	2.00
Fish meal	13.00	13.00	13.00	13.00	13.00
Soybean meal	3.50	2.50	2.50	2.50	2.50
Guar meal	5.00	5.00	5.00	5.50	4.00
Canola meal	5.20	5.30	5.33	5.36	4.89
Cotton seed meal	2.50	2.00	2.00	2.00	1.00
CG-30%	3.00	2.50	3.50	2.50	2.50
CG-60%	3.00	2.50	2.50	2.50	2.00
APC	6.50	4.00	4.00	4.50	4.00
Bone meal	0.50	0.50	0.00	0.00	0.00
Lime stone	0.50	0.50	0.00	0.00	0.00
Molasses	3.00	3.00	3.00	3.00	3.00
Supramix BR Premix	0.30	0.20	0.17	0.17	0.11
Total	100.00	100.00	100.00	100.00	100.00
Chemical composition					
Crude protein (%)	22.46	22.45	23.00	23.20	22.90
M.E. (Kcal/kg)	2959.00	2912.00	2909.00	2913.00	2900.00
Calcium (%)	1.26	1.58	1.89	1.03	1.04
Phosphorus (%)	0.61	0.57	0.50	0.50	0.50
Available Phosphorus (%)	0.51	0.50	0.58	0.40	0.40

CG = Corn gluten, HPC = Animal protein concentration, ME = Metabolizable energy

Table 2: Composition of finisher ration (%)

Ingredients	A	B	C	D	E
	Ration	Ration	Ration	Ration	Ration
Sunflower meal	0.00	5.00	7.00	9.00	11.00
Rice broken	50.00	50.00	50.00	50.00	50.00
Rice polish	10.00	10.00	9.00	10.00	10.00
Fish meal	9.00	8.00	8.00	8.00	8.00
Soybean meal	3.50	2.50	2.50	2.50	2.50
Guar meal	5.00	5.00	4.50	3.00	2.50
Canola meal	4.85	4.88	4.41	2.44	2.47
Cotton seed meal	2.00	2.00	2.00	2.00	1.00
CG-30%	6.50	4.00	4.00	4.00	4.00
CG-60%	2.50	2.00	2.00	2.00	2.00
APC	2.00	2.00	2.00	2.00	2.00
Bone meal	0.50	0.50	0.50	0.50	0.50
Lime stone	1.00	1.00	1.00	1.00	1.00
Molasses	3.00	3.00	3.00	3.00	3.00
Supramix BR Premix	0.15	0.12	0.09	0.06	0.03
Total	100.00	100.00	100.00	100.00	100.00
Chemical composition					
Crude protein (%)	19.24	19.26	19.33	19.28	19.27
M.E. (Kcal/kg)	2895.00	2869.00	2857.00	2857.00	2852.00
Calcium (%)	1.11	1.05	1.04	1.04	1.04
Phosphorus (%)	0.50	0.51	0.50	0.50	0.50
Available Phosphorus (%)	0.44	0.42	0.41	0.41	0.41

CG = Corn gluten, HPC = Animal protein concentration, ME = Metabolizable energy

Table 3: Production performance of broiler as affected by different proportions of sunflower meal

Groups	Feed consumption (g)	Av. Weight gain (g)	F.C.R.	Dressing percentage	Weight of edible parts (g)			Net profit per kg live weight (Rs.)
					Liver	Gizzard	Heart	
A (Control)	3756.80	1629.490	2.3100	56.3000	47.35	34.40	7.35	13.89
B (5% SM)	3766.80	1723.660	2.1800	57.9200	47.50	36.15	7.41	15.53
C (7% SM)	3774.14	1831.500	2.0600	60.3200	47.60	36.80	7.45	17.25
D (9% SM)	3771.91	1882.320	2.0000	62.6400	47.65	37.12	7.54	18.00
E (11% SM)	3774.90	1876.180	2.0100	62.2900	47.71	37.90	7.62	17.49
S.E. \pm	4.00	6.532	0.0300	0.3651	0.63	0.0252	28.58	-
LSD 0.05	13.19	21.540	0.1043	1.2050	-	-	-	-
LSD 0.01	-	29.390	0.1423	1.6430	-	-	-	-

* = Significant (P < 0.05) ** = Highly significant (P < 0.01) NS = Non significant

Table 4: Mean squares corresponding to production parameters of broiler as affected by different proportions of sunflower meal

Source of variation	DF	Mean squares						
		Av. feed Consumption (g)	Av. weight gain (g)	F.C.R.	Dressing percentage	Liver weight (g)	Gizzard weight (g)	Heart weight (g)
Blocks	03	13.333	113.33	0.016	0.0001	0.135	0.133	0.680
Groups	04	223.274*	48722.8**	0.070**	29.706**	0.080 NS	6.964	0.046 NS
Error	12	80.000	213.33	0.005	0.667	0.133	0.800	0.555
Total	19							

* = Significant (P < 0.05) ** = Highly significant (P < 0.01) NS = Non significant

in the groups, respectively. Group A was kept as a control. The starter (0-4 weeks) and finisher (5-6 weeks) ration was given ad libitum. The feed and water was given manually (Tables 1 and 2). **Following parameters were studied:** Initial live body weight (g) feed consumption (g) weight gain (g) feed Efficiency (FCR) dressing percentage weight of edible parts (liver, gizzard, heart) economics collected data was subjected to statistical analysis to discriminate the superiority of treatment means as well as control using the standard statistical methods of analysis of variance suggested by Gomez and Gomez (1984) was used. The differences between means were derived by using LSD test.

Results and Discussion

Feed consumption: Birds in Group A (control) consumed comparatively lesser amount of feed than rest of the treatment groups, while Group E consumed maximum feed (3774.90 g), followed by groups C, D, B with 3774.14, 3771.90 and 3766.80 g, respectively. The minimum feed consumed (3756.80 g) was observed in group A (Table 3). The results were statistically non-significant (Table 4) and there were no either linear or even overlapping significance in differences between the treated groups or control. These results are in agreement with those of Ibrahim and El-Zubeir (1991) who have also reported comparable results with this study.

Weight gain: Average weight gain was 1629.49, 1723.66, 1831.50, 1882.32 and 186.18 g in groups A, B, C, D and E, respectively. Group D has maximum weight gain (1882.32 g) while the lowest weight gain (1629.49 g) was in control group A (Table 3). The weight gain significantly improved with each increased SM level. However, differences between group D and E were non-significant statistically. The results of this study are partially supported by the findings of Irshad and Balnave (1993); Murtazaeva (1994) and Sadagopan *et al.* (1993) they all reported improved weight gain with addition of sunflower meal in the self prepared feed.

Feed efficiency: F.C.R. (feed efficiency) of broilers was 2.31, 2.18, 2.06, 2.00 and 2.01 in groups A, B, C, D and E, respectively. Nutritionally best results were obtained from group D with F.C.R. of 2.00, while F.C.R. was minimum 2.31 in control group A (Table 3). The differences were, however, significant with varied levels of significance between means of SM added, but non-significant between groups D (9% SM), C (7% SM) and E (11% SM) The results of this investigation are further confirmed by the findings of Miazzo and Kraft (1991) and Nikolovshi *et al.* (1994). They all

were of the opinion that sunflower meal can be used with self prepared feed successfully for getting better feed efficiency.

Dressing percentage: Dressing percentage of broilers in groups A, B, C, D and E, was 56.30, 57.92, 60.32, 62.64 and 62.29 respectively. Group D has maximum dressing percentage (62.64) and proved to be optimum nutrition level, while, the minimum dressing percentage of 56.38 was recorded in group A (control). Each increased SM level improved dressing percentage significantly, but the differences were non-significant between groups the results of investigation are also supported by the findings of Steinwidder *et al.* (1993) and Sadagopan *et al.* (1993), who were of the view that dressing percentage can be improved by sunflower meal alongwith self prepared feed.

Weight of edible parts: Among the edible parts, liver and heart weight of broilers was not affected significantly and liver weight was 47.35, 47.50, 47.60, 47.65 and 47.71 g and hear weight 7.35, 7.41, 7.45, 7.54, and 7.62 g in groups A, B, C, D and E, respectively. However, the gizzard weight was affected significantly due to addition of sunflower meal (SM) in self prepared feed and recorded 34.40, 36.15, 36.80, 37.12 and 37.90 g weight in groups A, B, C, D and E, respectively. Maximum gizzard weight (37.90 g) was in group E (11% sunflower meal) while minimum gizzard weight of 34.40 g in group A (Control). Differences were significant in gizzard weight when comparison of treated groups were made with control, but non-significant within treated groups. These results are in agreement with those of Petrina (1987), Dogan and Zincirlioglu (1985) and Ologhobo (1991) they all reported non-significant effect of sunflower meal on liver, heart or gizzard which is well comparable with the results of this study.

Economics: The cost per kilogram live broiler weight was 34.11, 32.47, 30.75, 30.00 and 30.21 rupees in groups A, B, C, D and E, respectively, while the live broilers were sold at the rate of 48 rupees per kg. Thus, considerable net profit was achieved and in groups A, B, C, D and E, the amount per kg live weight realized was 13.89, 15.53, 17.5, 18.00 and 17.79 rupees, respectively. However, the chicks in group D (9% sunflower meal) realized maximum per kg live weight profit, while the control (zero SM) remained lowest.

While going through the results of this study, it was concluded that addition of sunflower meal was nutritionally advantageous for the broilers under our conditions. However, 9% sunflower meal level in this study was found comparatively productive and economical.

Solangi *et al.*: Efficiency of sunflower meal in broiler

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