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EFFECT OF FEEDING DIFFERENT COMBINATIONS OF SUNFLOWER MEAL AND COTTON SEED MEAL ON THE PERFORMANCE OF BROILER CHICKS

F.R. Durrani, N. Chand., M. Farooq., R. Ali and Z. Durrani

Department of Poultry Science, NWFP Agricultural University, Peshawar, Pakistan

ABSTRACT

This study was planned to investigate the effect of different combinations of sunflower meal and cotton seed meal in isonitrogenous and isocaloric rations on the performance of broiler chicks. Five experimental rations designated as A, B, C, D and E having sunflower meal and cotton seed meal (0, 3, 6, 9 and 12% sunflower meal with corresponding levels of 12, 9, 6, 3 and 0 % of the cotton seed meal) were fed to 250 broiler chicks, randomly distributed into 5 main groups, A, B, C, D and E, where each main group was further divided into 5 sub groups contained 10 birds each. The birds were reared for a pre-experimental period of 6 days on commercial ration followed by 33 days of experimental period. Average weight gain, feed consumption, feed efficiency, dressing percentage, cost of feed per unit weight gain and mortality were used as criteria of response. The mean body weight gain per chick was 1441, 1464, 1533 and 1484 g. The body weight gain in group C was significantly higher ($P<0.05$) than other groups. The average feed consumption per chick was 3241, 3431, 3433, 3460 and 3454 g. The feed consumption in group D was significantly higher ($P<0.05$) as compared with other groups. The mean feed efficiency (feed/gain) was 2.24, 2.34, 2.23, 2.33 and 2.33. The mean dressing percentage was 64.90, 64.18, 66.04, 64.31 and 64.17. The average cost of feed per kg body weight gain was Rs.17.28, 17.90, 16.95, 17.50 and 17.35 and mortality was 0, 0, 2, 0, and 3 for treatment A, B, C, D and E, respectively. Considering all the parameters of response, it is concluded that both sunflower meal and cotton seed meal may be used at 6% level each in the broiler ration for optimum performance.

Key words: Chicken feed, sunflower meal, cotton seed meal, broiler chicks

INTRODUCTION

Feed cost is a major component contributing 60-70% of the total cost of broiler production. Therefore, it is necessary to formulate least economical ration to get maximum profit. For this purpose agro-industrial by-products, such as oil seed cakes and meals could be included as protein supplement.

Sunflower is the second most important source of vegetable oil in the world after soybean (FAO, 1970). The meals produced from dehulled sunflower meal contains 37-44% protein. Which is a better source of arginine and methionine than soybean but, a poor source of lysine, cystine and glycine. Moreover, it is also an excellent source of pantothenic acid, choline and niacin. Sunflower meal used as substitute of soybean meal upto 50% in the poultry ration while up to 100% when lysine is added (Fereidoon and Kavous, 1976). Biological studies have shown that sunflower meal protein is univalent to soybean protein and is superior to most vegetable proteins in terms of digestibility (FAO, 1970). Soybean meal is well known for its quality protein as compared with other oil cakes and meals. However, due to its low production, insufficient processing plants and higher import cost, affects the use of soybean in poultry ration. Moreover, sunflower meal and cotton seed meal are cheaper and easily available in the market. Keeping in view, the easy availability and cheapest source of protein, the study was planned to investigate the effect of different combinations of sunflower meal and cotton seed meal in isonitrogenous and isocaloric rations on the performance of broiler chicks.

MATERIALS AND METHODS

This research project was conducted at the NWFP Agricultural University, poultry farm, Peshawar. Experimental rations were formulated on the basis of nutritional composition of feed ingredients, reported in the literature (NRC, 1984). Five isocaloric and isonitrogenous experimental rations, designated as A, B, C, D and E were prepared with 0, 3, 6, 9, 12% sunflower meal and 12, 9, 6, 3 and 0% cotton seed meal respectively (Tables 1 and 2). The experimental rations were prepared in a local commercial feed mill.

Five hundred commercial straight run-day-old broiler chicks were obtained from commercial hatchery. All the chicks were reared collectively on floor far a pre-experimental period of six days. Commercial ration was used during first six days and the entire chicks were kept under similar management conditions. On seventh day, 250 chicks were divided into 5 experimental treatments with 5 replicates per treatment and 10 chicks per replicate. Feed was given ad libitum. Clean water was made available throughout the experimental period. On day 7, all the experimental chicks were vaccinated against Newcastle disease through eye drops, with a booster dose given sub

cutaneously on day 28. On day 18, all the chicks were vaccinated against infectious bursal disease with a booster dose given on day 30.

The experiment was continued for five weeks. Observations were made on general health and mortality. Record of the feed offered in each replicate and of the left-over feed was maintained to calculate the feed consumption. Data on the body weight of the chicks were recorded at the end of the experiment after a three hour fast. Feed efficiency (feed/gain) values were calculated from feed consumption and body weight gain data.

At the end of the experimental period, two broilers after recording their live weight were slaughtered from each replicate. After slaughtering, the skin and the inedible parts including feather, head, feet and viscera were removed and the carcass weight was taken. Dressing percentage was determined from the live and carcass weight data.

Economics of the experimental rations were determined by calculating the feed required per kg body weight gain and the corresponding cost involved in each treatment. All the data were analyzed, using the General Linear Models procedure of SAS (SAS Institute, 1988).

Table.1. Composition of the experimental rations.

Ingredients	**A**	**B**	**C**	**D**	**E**
Sunflower meal	0.00	3.00	6.00	9.00	12.00
Cottonseed meal	12.00	9.00	6.00	3.00	0.00
Corn	30.00	30.00	30.00	30.00	30.00
Wheat	24.00	24.00	24.00	24.00	24.00
Rice polishing	4.00	4.00	4.00	4.00	4.00
Corn gluen feed (20 %)	2.00	2.00	2.00	2.00	2.00
Corn gluten meal (30 %)	2.00	2.00	2.00	2.00	2.00
Corn gluten meal (60%)	2.00	2.00	2.00	2.00	2.00
Soybean meal	4.00	4.00	4.00	4.00	4.00
Rapeseed meal	3.00	3.00	3.00	3.00	3.00
Guar meal	3.00	3.00	3.00	3.00	3.00
Fish meal	5.00	5.00	5.00	5.00	5.00
Blood meal	2.00	2.00	2.00	2.00	2.00
Poultry byproducts meal	3.10	3.10	3.10	3.10	3.10
Vegetable oil	1.25	1.25	1.25	1.25	1.25
DCP	1.00	1.00	1.00	1.00	1.00
Limestone	1.00	1.00	1.00	1.00	1.00
D.L.Methionine	0.10	0.10	0.10	0.10	0.10
Vitamin premix[1]	0.50	0.50	0.50	0.05	0.05
Avatic[2]	0.05	0.05	0.05	0.05	0.05
	100.00	00.00	00.00	100.00	100.00

1 Vitamin premix supplied the following nutrients per 100 kg. Vit, A 800 g: Vit, D3 140g: Vit, E.800 g: Vit, K80 g: Vit, B1 60 g: Vit, B2 160 g: Niacin 800 g: Pantothenic acid 300 g: Vit, B6 140 g: Vit, B12 600 g: Folic acid 30 gm: Biotin 3 g: Vit, C 200 g. Choline chloride 30,000 g: Furazolidone 2000 g: zinc Bacitracin 5000 g: B.H.T. 2400 g: Lysine 5000 g: D.L.Methionine 4000 g: NaCl (salt) 6000 g: Copper sulphate 300 g: Ferrous sulphate 500 g: zinc sulphate 1800 g: Glut, 60% q.s 35487 g;
2 coccidiostat.

RESULTS AND DISCUSSION

Findings pertaining to body weight gain, feed consumption, feed efficiency, dressing percentage, economics of experimental rations, mortality and overall performance of chicks are presented under various sections as follow.

Body weight gain

Mean weight gain per chick for the five experimental rations A, B, C, D and E having 0, 3, 6, 9 and 12% sunflower meal was 1441, 1464, 1533, 1484 and 1480 g respectively (Table 3). Maximum weight gain (1533±21.667g) was observed in group C, having 9% sunflower meal and minimum body weight gain (1441±11.30g) was recorded in group A, having no sunflower meal. The findings of the present study are in confirmation with the results, stated by Steinwidder *et al.* (1993), they concluded that 5 and 10% sunflower meal can

be used in poultry ration to obtain maximum body weight gain, but are not in agreement with that reported by Valdivie *et al*. (1983), who reported that 20% sunflower meal in feed can be used for optimum weight gain.

Table. 2 Percent nutrient Composition of the Experimental Rations.

	A	B	C	D	E
ME (kcal/kg)	2958	2964	2970	2976	2982
Crude protein (%)	23.10	23.12	23.14	23.15	23.17
Ca (%)	1.02	1.03	1.03	1.03	1.04
P, available (%)	0.53	0.53	0.53	0.53	0.53
Methionine (%)	0.55	0.54	0.54	0.54	0.54
Met. +Cystine (%)	1.00	0.98	0.96	0.95	0.93
Lysine (%)	1.13	1.12	1.11	1.10	1.09
Tryptophan (%)	0.26	0.26	0.26	0.26	0.26
Linoleic acid (%)	1.42	1.42	1.42	1.42	1.42
Crude fiber (%)	4.06	4.17	4.29	4.40	4.51

Feed consumption and feed efficiency

Average feed consumption per chick was 3241, 3431, 3433, 3460 and 3454 g for group A, B, C, D and E respectively (Table 3). Feed consumption was highest (3460±20.437g) in group D (9% sunflower meal) and lowest (3241±39.609 gm) in group A. The present findings indicate that the feed consumption increased with the increase level of sunflower meal. In contrast the result reported by Boonlom and Suchan (1990), showed that the feed consumption is decreased with the increase in sunflower meal. The mean feed efficiency (feed/gain) was 2.24, 2.34, 2.23, 2.33 and 2.33 in the five experimental groups (A, B, C, D and E). Feed efficiency was higher (2.35±0.016) in group B (3% sunflower meal). The findings of the present study are different from those of Salih and Taha (1989), who reported non significant differences in feed conversion ratio at 0, 10, 20 and 40% level of sunflower meal in the ration.

Dressing percentage

Average dressing percentage was 64.90, 64.18, 66.04, 64.13 and 64.17 for group A, B, C, D and E respectively (Table 3). High dressing percentage was observed in group C (6% sunflower meal). However, when the data was subjected to analysis of variance, non significant differences were revealed among the groups.

Mortality

Mean mortality of groups A, B, C, D and E was 0, 0, 8, 0 and 12% respectively (Table 3). Highest mortality was recorded in group E (12% sunflower meal). The mortality observed was mainly due to disease incidence, because the necropsy finding indicate severe enteritis and had no concern with experimental rations. The present findings are not in agreement with the results of Salih and Taha (1989) who used sunflower meal at 0, 100, 200, and 400 g/kg of feed and observed that the mortality was the same in all groups.

Economics of experimental rations

The average cost of feed per kg body weight gain was Rs.17.28±0.141, 17.90±0.084, 16.95±0.142, 17.50±0.196 and 17.35±0.221 for treatment A, B, C, D and E respectively (Table 3). Feed cost per kg weight gain was significantly lower (16.95±0.142) in group C as compared with all other groups. Maximum return of Rs.2.36±0.019 per unit cost was observed in group C. Valdivie *et al.* (1982) also reported lower feed cost of 407 US Dollars per ton live weight for rations having sunflower meal and 449 US Dollars for rations, having no sunflower meal. The higher return per unit cost of feed in group C is due to the optimal level of sunflower meal in the ration and higher efficiency (2.24±0.019) of the ration (Table3).

Overall performance:

Considering all the parameters of response including weight gain, feed consumption, feed efficiency, dressing percentage, mortality and cost of feed per kg weight gain the use of 6% Sunflower meal in broiler rations resulted in overall improvement in the performance of broilers.

It was concluded from the results that the combinations of sunflower meal and cottonseed meal each at 6% level in broiler rations, result in improvement of body weight gain, feed efficiency, dressing percentage and economics of broiler chicks.

Table 3. Overall performance of broiler chicks fed different experimental rations

S.No.	Parameters	Treatments					P.value	LSD Value
		A (0%SFM)	B (3% FM)	C (6%SFM)	D (9%SFM)	E (12% FM)		
1.	Wt. gain/chick (g)	1441^{b}	1464^{b}	1533^{a}	1484^{b}	1480^{b}	0.0414	53.735
2.	Feed consumption/chick (g)	3241^{b}	3431^{a}	3433^{a}	3460^{a}	3454^{a}	0.0183	325.08
3.	Feed efficiency (F/G)	2.24^{b}	2.34^{a}	2.23^{b}	2.33^{a}	2.33^{a}	0.0031	0.2033
4.	Dressing %	64.90	64.18	66.04	64.31	64.17	0.2950	1.999
5.	Feed cost/Kg Wt. Gain (Rs.)	17.28^{ab}	17.90^{a}	16.95^{b}	17.50^{ab}	17.35^{ab}	0.0091	-
6.	% Mortality	0^{b}	0^{b}	8^{ab}	0^{b}	12^{a}	0.0302	-

Means in the same row bearing the same superscript are non significant ($P<0.05$); SFM = Sunflower meal.

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