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Effect of Different Dietary Levels of Egyptian Clover on Broiler Performance

Muhammad Arif¹, Mushtaq Ahmed Mian and Fazli Raziq Durrani

¹Department of Poultry Science, Faculty of Animal Husbandry and Veterinary Science, NWFP Agricultural University, Peshawar

¹Present Address: Veterinary Research Institute, G.P.O. Box 367, Peshawar

Abstract: This study was planned to investigate the optimum level of Egyptian clover, as a supplementary protein source in broiler ration. Five experimental rations having 0, 2, 4, 6 and 8% sun-cured Egyptian clover were fed to 250 broiler chicks. A pre-experimental period of 5 days was followed by 35 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 1343^b, 1385^b, 1388^b, 1457^a and 1365^b grams ($p < 0.01$). The average feed consumption per chick was 3446^b, 3423^b, 3464^b, 3687^a and 3307^b grams ($p < 0.05$). The mean feed efficiency (feed/gain) was 2.57, 2.47, 2.50, 2.53 and 2.42. The mean dressing percentage was 72.48, 72.99, 72.72, 72.54 and 72.20; the average cost of feed per Kg body weight gain was Rs. 20.56, 19.56, 19.63, 19.68 and 18.63 and mortality was 2, 6, 10, 6 and 2% for treatment having 0, 2, 4, 6 and 8% clover respectively. Considering all the parameters of response it was concluded that sun-cured Egyptian clover might be used at 6% dietary level in the broiler ration for optimum performance.

Key words: Poultry clover ration

Introduction

Clover (*Trifolium* spp.) is one of the most important legume fodder crops and has been called the king of fodder. It is widely used as a green fodder for all livestock. Dried clover is also an important poultry feed (Zlatic and Dumanovsky, 1993). Due to its desirable qualities, it is suggested that it might be the cheapest supplementary protein source in poultry ration. Several research workers (Cooney *et al.*, 1948; Draper, 1948; German and Couch, 1950; Holder *et al.*, 1975; Kaminska, 1989) have evaluated the nutritive value of alfalfa above 5% resulted in growth depression of chicks. However, Holder and Burdick (1980) reported that clover could serve as an acceptable protein source up to 7.5% level in the chick diet. Alfalfa has also been efficiently utilized up to 18 percent in the layer ration, while 3% level improved egg production (Sullivan *et al.*, 1966). Better egg yolk pigmentation was obtained by giving 11 or 14% alfalfa to laying hens (Kuchta *et al.*, 1993). Keeping in view the nutritional value, easy availability and low cost of clover, a research project was planned to investigate the use of different dietary levels of sun-cured Egyptian clover (*Trifolium slexandrium* L.) or berseem as a supplementary protein source on broiler performance.

Materials and Methods

Two hundred and fifty commercial straight-run day-old broiler chicks were reared for a pre-experimental period of five days, and then divided into five experimental treatments with 5 replicates per treatment and 10 chicks per replicate. Five isocaloric and isonitrogenous experimental rations (Table 1) with 0, 2, 4, 6 and 8% sun-cured Egyptian clover were randomly allotted to the chicks. Feed and water supplied *ad libitum* for a 5-week experimental period. The temperature in the pen was maintained at about 90-95°F in the first week and was decreased gradually by 5°F per week. Continuous lighting was provided throughout the experimental period. Observations on body weight gain, feed utilization, feed efficiency, dressing percentage, cost of feed per Kg weight gain and mortality were used as criteria of response. The data were statistically analyzed, using the General Linear Models Procedure of SAS (SAS Institute, 1998).

Results and Discussion

Body weight gain: The addition of clover at all levels caused some improvement in weight gain of the chicks. The body weight gain revealed highly significant ($p < 0.01$) difference among the treatments. Table 2 shows that 6 percent clover gave significantly higher ($p < 0.01$) body weight gain as compared to all other treatments. Addition of clover at the rate of 2, 4 and 8% caused apparent improvement in growth as compared to the control. The present findings are in agreement with those of Holder and Burdick (1980), who concluded that clover served as an acceptable protein source in broiler ration up to 7.5% level. The present findings are not in agreement with those reported by Kaminska (1989) who observed that diets with more than 5% Lucerne meal decreased live weight gain. This may be due the difference in the variety and composition of clover.

Feed consumption: The feed consumption data revealed significant differences ($p < 0.05$) among the treatments means. Six percent clover showed significantly ($p < 0.05$) higher feed consumption clover as compared with other levels (Table 2). There are non-significant differences among all other treatments. The results of the present study supported the findings of Asmat *et al.* (1976), who observed improved feed consumption in broiler chicks in response to 6% berseem leaf residue.

Feed efficiency: Statistical analysis of the feed efficiency revealed non-significant differences among treatments (Table 2). Similar results were obtained by Holder and Burdick (1980). The present findings are not in complete agreement with those reported by Kaminska (1989) who reported that more than 5% Lucerne meal decreased feed efficiency.

Dressing percentage: The dressing percentage data revealed non-significant differences among different treatments (Asmat *et al.*, 1976).

Economics of the experimental rations: The cost of feed per kg weight gain was the highest in control as compared with all other treatments (Table 2). Addition of clover in the rations

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Table 1: Ingredient percentage and calculated analysis of the experimental rptions

Ingredients (%)	Added sun- cured Egyptian clover levels (%)				
	0	2	4	6	8
Rice polishing	6.00	6.80	7.60	8.40	9.20
Wheat bran	11.20	8.40	5.60	2.80	0.00
Corn	30.00	30.00	30.00	30.00	30.00
Wheat	26.00	26.00	26.00	26.00	26.00
Vegetable oil	2.00	2.00	2.00	2.00	2.00
Corn gluten meal 60 percent	3.00	3.00	3.00	3.00	3.00
Sunflower meal	3.00	3.00	3.00	3.00	3.00
Cottonseed meal	2.00	2.00	2.00	2.00	2.00
Guar meal	2.00	2.00	2.00	2.00	2.00
Fish meal	10.00	10.00	10.00	10.00	10.00
Blood meal	2.00	2.00	2.00	2.00	2.00
Dicalcium phosphate	0.90	0.90	0.90	0.90	0.90
Limestone	1.00	1.00	1.00	1.00	1.00
Salt (iodized)	0.10	0.10	0.10	0.10	0.10
Vitamin mineral premix	0.50	0.50	0.50	0.50	0.50
D L-methionine	0.15	0.15	0.15	0.15	0.15
Choline chloride	0.10	0.10	0.10	0.10	0.10
Vitamin E	0.03	0.03	0.03	0.03	0.03
Zinc bacitracin 10 percent	0.02	0.02	0.02	0.02	0.02
Calculated nutrient analysis					
Metabolizable Energy (kcal/kg)	2953.00	2953.00	2953.00	2952.00	2952.00
Crude protein	21.10	21.00	21.00	21.00	20.90
Calcium	1.04	1.06	1.08	1.10	1.10
Phosphorus, available	0.57	0.57	0.56	0.56	0.56
Methionine	0.59	0.59	0.59	0.60	0.60
Methionine + cystine	0.95	0.95	0.96	0.97	0.97
Lysine	1.04	1.04	1.04	1.05	1.05
Tryptophan	0.27	0.27	0.26	0.26	0.26
Linoleic acid	2.32	2.31	2.30	2.28	2.28
Crude fiber	3.64	3.95	4.25	4.56	4.86

Table 2: Overall performance

Ration	Av. weight gain/chick (gm)	Av. Feed cons./chick (gm)	Av. Feed efficiency	Av. Dress. Percentage	Feed cost/kg wt. Gain (Rs)	Mortality percent
0 percent clover	1343	3446	2.57	72.48	20.56	2
2 percent clover	1385	3423	2.47	72.99	19.56	6
4 percent clover	1388	3464	2.50	72.73	19.63	10
6 percent clover	1457**	3687*	2.53	72.54	19.68	6
8 percent clover	1365	3307	2.42	72.20	18.63	2

*Significant; **Highly significant

resulted in efficient feed utilization, thereby decreasing the cost of production per unit weight gain. Although the feed efficiency (feed/gain) values did not differ significantly, yet, the feed cost calculated on the basis of Kg weight gain was the lowest in treatment having 8 percent clover, while the other levels of Egyptian clover (2, 4 and 6%) were not much different from one another.

Mortality: Table 2 shows that mortality remained within the normal limits in all the treatments and was mainly due to (*E. coli*) infection, coccidiosis and infectious bursa! disease (Gumboro) having no correlation with the experimental rations.

Overall performance: The overall performance of chicks fed different experimental rations, considering all the parameters of response including weight gain, feed consumption, feed efficiency, dressing percentage, cost of feed per Kg weight gain and mortality (Table 2), it was concluded that sun-cured Egyptian clover may be added in isocaloric and isonitrogenous broiler ration at 6% dietary level for optimum performance of broilers.

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