

Effect of Dietary Cumulative Levels of Cotton Seed Meal on the Performance and Certain Blood Parameters of Broiler Chicks

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Abstract

Two hundred and forty one day old chicks (Arian) were used in a completely randomized design with four treatments and five replicates for each treatment. The experimental treatments included the levels of 0,3,5,7 and 10.5% of cotton seed meal in diets fed to chickens at 7-21d of age. Except for the control group, these levels for grower period (21-42d) was increased to 7,14 and 21% and for finisher period (42-49d) increased to 14,21 and 21% respectively. Body weights, feed consumption and feed conversion were determined weekly. Blood was collected at 49d for measuring red blood cell, hemoglobin and hematocrit. The results from this study indicated we can use cotton seed meal at levels of 7,14 and 21% of diets, respectively, in starter, grower and finisher period without having any adverse effects on the performance and carcass yield of broiler chicks.

Key words: Broiler, Cotton seed meal, Performance, Blood parameters.

Introduction

Cotton seed meal (CSM), is a by-product of the cotton fiber and oil industry. Although CSM is a good source of protein, but the use of CSM in poultry rations is limited as this feed ingredient has lower CP, and available lysine contents than soybean meal (SBM). Additionally, the presence of gossypol and cyclopropenoid fatty acids (CPFA) lowers the desirability of this feed ingredient (Lordelo et al, 2004). Cottonseed meal (CSM) incorporated into broilers diets at levels of up to 20 percent has been shown to support body weights and feed conversion similar to that observed in broilers fed isocaloric corn-soybean meal diets (Watkins et al., 1994; Watkins et al., 1995; Fernandez et al. ,1995). However, when 30% CSM was fed, performance (weight, feed conversion) was depressed. The use of CSM in diet decrease plasma iron level because free gossypol from CSM may bond with iron in intestine or liver and lead to low levels of HGB and HCT in blood (Boling et al. 1998) .The objective of this research was to evaluate the use of various levels of CSM in diet at different ages on performance and some blood parameters in broiler chicks.

Materials and Methods

Two hundred and forty one-day-old (Arian) chicks were allocated to one of four treatments of 60 chicks in each treatment in a completely randomized design. Each treatment was represented by five replicates of twelve birds within per pen. All chicks were fed by isocaloric and isonitrogenous diets, formulated to meet all their nutrients need, according to the NRC (1994) from 7d to 49d. The treatments included the different levels of cotton seed meal in starter, grower and finisher period (Table 1). Body weight gain, feed intake and feed conversion were determined when the birds were 7, 21, 42 and 49 days of age. Blood was collected on 49d for measuring red blood cell (RBC), hemoglobin (HGB) and hematocrit (HCT). At 49 day of age four chicks were chosen randomly from each pen were killed and abdominal fat pad, liver and intestine were removed, weighed and expressed as a percentage of live body weight. Data from all responses variable were subjected to a one-way analysis of variance (SAS Institute, 1990) and Duncan's procedure was used to determine statistical significance among means.

Table 1. Treatments plan of experiment

Treatments	Age(day)		
	7-21	21-42	42-49
	Percentage of CSM in diet		
A	0	0	0
B	3.5	7	14
C	7	14	21
D	10.5	21	21

Results and Discussion

Increasing the levels of CSM had no significant effect on body weight in different age. Though it lead to non-significant decrease on body weight at 49 d especially in D group (Table 2). This is because of high amount of fiber and existence of gossypol in CSM, that can decrease feed efficiency and body weight gain in chicks fed diets containing high levels of CSM. The current results are agreement with those of El-Boushy et al (1989) and Watkins et al (1993). Increasing the level of CSM had no significant effect on daily gain in different periods and 7 to 49 days of age, but this caused non significant decrease in body weight. Increasing the amount of CSM in diets lead to significant increase in feed intake at 7-21d. In other ages and whole period of rearing CSM levels had not significant effect on feed consumption. The noticeable point is the relationship between the levels of CSM and feed intake that was increased by adding CSM in diets, can be attributed to an increase in diet fiber. As it is observed in table 2 feed conversion of broiler received CSM in diet was increased but it was not significant. Fernandez et al (1995) reported one of the CSM limitation in broiler diet is due to its high amount of fiber and consequently efficiency of feed utilization is decreased (Henry et al 2001). Slightly decrease in certain blood parameter (RBC, HGB and HCT) is observed with increasing the levels of CSM in diet but it was not significant (Table3). These results agreement with finding of Henry et al. (2001) who reported the hemoglobin contents and hematocrit values of blood from chicks fed diets with 20% CSM were not significantly different from those of the controls. Abdominal fat pad, liver and intestine weight as a percentage of live body weight were not affected by CSM levels.

Table 2. Effect of dietary levels of cotton seed meal on body weight and feed conversion of broilers at different ages

Treatments	7-21 d		21-42 d		42-49 d		7-49 d
	Body Weight	Feed Conversion	Body Weight	Feed Conversion	Body Weight	Feed Conversion	Feed Conversion
A	493.6	1.95	1710.2	2.07	2544.6	3	2.01
B	511.5	1.98	1734.8	2.08	2536.2	3.2	2.07
C	495.7	2.05	1755.2	2.08	2528.6	3.2	2.08
D	512.5	2.01	1677.4	2.23	2478.2	3.2	2.16
SE	53.2	0.008	173.8	0.012	253.1	0.081	0.044

Means in a column with no common superscripts differ significantly (P<0.05)

Table 3. Effect of dietary levels of cotton seed meal on blood parameters of broilers at 49 days of ages

Treatments	A	B	C	D	SE
Blood Parameters					
Red blood cell (No/ml)	2820000	2780000	2700000	2710000	0.137
Hemoglobin (g/dl)	10.8	10.3	10.2	9.8	0.442
Hematocrit (%)	28.5	27.5	26.9	27.1	1.23

Means in a column with no common superscripts differ significantly (P<0.05)

Conclusion

The results from this study indicated we can use cotton seed meal at levels of 7, 14 and 21% of diets, respectively, in starter, grower and finisher period without having any adverse effects on the performance and carcass yield of broiler chicks.

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