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DETERMINATION OF OPTIMUM LEVEL OF MASH COMBINATION WITH FULL-FAT SOYABEAN MEAL IN A MIXED-FEEDING REGIME FOR BROILER CHICKEN

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ABSTRACT: *A mixed-feeding trial consisting of five different treatments of commercial broiler finisher (CBF) and full-fat soyabean meal (FFSBM) was carried out. The treatment groups were fed ad libitum and water at all times. One hundred (100) broiler birds of commercial strain of 5 weeks of age in five treatments group were used in this study with twenty-birds per treatment. Broilers in the experimental group were balanced for initial body weight. Calculated composition of the commercial broiler finisher in used was 20 % crude protein (CP) and 12.5 MJ (ME). Final body weight at 10 weeks for CBF (control), CBF + 15 % FFSBM, CBF + 20 % FFSBM, CBF + 25 % FFSBM, and CBF + 30 % FFSBM were 2619.00 g, 2301.90 g, 2401.80 g, 2428.60 g and 2512.50 g respectively. Broilers on CBF + 25 % FFSBM were found to be comparatively most efficient in the conversion of feed into body tissues. The results showed that in a mixed-feeding regime of CBF with FFSBM up to 25 % will induce fast growth, early attainment of market age and early sexual maturity in male broiler birds. The study has therefore established that 25 % FFSBM level in a mixed-feeding regime was the optimum for growing broilers.*

KEYWORDS: Optimum, commercial strain, fast growth, sexual maturity; mixed-feeding, broiler finisher.

INTRODUCTION

Broilers are fast growing chickens and they are commonly produced to provide tender meal carcass for human consumption, especially when there is preference for tender table meat. The rearing period for broiler chicken production ranges from 6 to 12 weeks of age when the slaughter weight of 1.6 to 2.5 kg should be attained (Amata and Ubosi 2007; Amaefule, 2009). Certain feed ingredients like full-fat soyabean meal as sources of protein have nutritional value that their content of Amino-acid is readily available and useful to the need of broiler for rapid growth and early maturity.

Soya bean meal is one of the most common protein feed ingredients used in formulating animal diets especially poultry feed. In spite of its scarcity and high cost, poultry industry prefer soyabean meal as a source of protein to other protein ingredients because of its high digestibility percentage estimated as up to 91.9 % (ARC, 2005). Adequate feeding is one of the most essential factors in poultry production. Most local farmers feed their birds with little protein ingredients, which may not give maximum performance. A mixed - feeding regime of mash combination with full-fat soyabean meal for broiler chicken is important. However, the high cost of full-fat soyabean meal sometimes compels rural producers to refuse the use of it. It was therefore, of great concern, hence there is need to determine the percentage amount of full-fat soyabean meal inclusion on commercial broiler finisher.

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The main objective of this study was to determine the optimum level of mash combination with full-fat soyabean meal in a mixed-feeding regime for broiler chicken under the rainforest zone of Nigeria.

MATERIALS AND METHODS

Study Site

The study was conducted in the poultry unit of the Delta State Polytechnic livestock Research farm. The farm is located within the polytechnic which is on latitude 5° 30^1 and 5° 45^1 N and longitude 5° 40^1 and 6° E on the Greenwich meridian. The area has an annual rainfall of between 2500 - 3000mm and means temperature at the poultry unit was 27. 4^0C with range of 25°C to 30°C all through the period of the study (Meteorological Station Ozoro, 2013).

Animals, Feeding Housing And Management

A total of one hundred (100) broiler birds of commercial strain of Day-old chicks of age were obtain from Emakpo Hatchery industry, Kwale for the study. Day old chicks were managed under brooding system till five (5) weeks of age. Thereafter, the experimental birds were divided into five groups with twenty birds per treatment. The grouping was done on the basis of uniformity of body weight. The birds were in deep litter management measuring 3 m x 1.5 m each. Wood shavings were used as litter on the concrete floor. Feeders and drinkers were provided within each pen. The treatments comprised commercial broiler finisher (CBF), 15 % full-fat soyabean meal (FFSBM) + (CBF), 20 % FFSBM + CBF, 25 % FFSBM + CBF and 30 % FFSBM + CBF fed *ad libitum.* Water was supplied at all time. The birds were vaccinated according to schedule. Coccidiostat was given at intervals of 2 to 3 weeks for prevention against coccidiosis. Antibiotics were administered at regular intervals to prevent bacterial infection.

Calculated composition of the commercial broiler finisher was 20 % crude protein and 12.5 MJ (ME). The crude protein of the full-fat soyabean meal as determined by analysis at the international institute for tropical Agriculture Ibadan (IITA) was 44 %.

Data Collection

Mash intake was determined at weekly intervals and body weight (BW) data were also taken at weekly intervals after the initial body weight was recorded. Growth rate of the birds from 6 weeks to 10 weeks of age was determined.

Statistical Analysis

Analysis of variance was carried out to compare the mean body weight and rates of gain for the different treatments. Significantly different .treatment means were separated by Duncan's multiple Range Test. (Steel and Torrie, 1980). Experimental model for the analysis was:

$Yij = u + Ti + eij$ Where,

Yij = Observed body weight/gain
μ = Over the five group mean

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Ti = Treatment effect

eij = Experimental error

RESULTS AND DISCUSSION

Table 1 shows the average weekly body weight of experimental broiler chickens under a mixed-feeding regime from 5-10 weeks. The results showed that there was significant ($P<0.05$) treatment effect on the final body weight of the experimental broiler chickens. Body weights of broiler chickens on (CBF) (control), CBF + 15 % FFSBM, CBF + 20 % FFSBM, CBF + 25 % FFSBM, CBF + 30 % FFSBM at 10 weeks were not significantly ($P > 0.05$) different.

However, body weight for CBF at 10 weeks was significantly higher than the 2440 g reported on feeding regime (concentrated) by Reddy (2006). Such differences in body weight attainment could be argued on breed and feed composition. Results showed that broiler chickens on CBF weighed on the average 2619 g as against 2301.9 g CBF + 15 %FFSBM, 2401.8 g CBF + 20 % FFSBM, 2428.6 g CBF + 25 % FFSBM and 2512.5 g CBF+ 30% FFSBM respectively.

However, the broiler birds on CBF + 25 % FFSBM showed a rapid increase in body weight from 7-10 weeks. Final body weights of broiler birds fed CBF + 30 % FFSBM was 2512.5 g higher than that for broiler birds on CBF + 15 % FFSBM, CBF + 20 % FFSBM and CBF +25 % FFSBM. Final body weight of broiler chicken on CBF + 25 % FFSBM was 217.20 g lower than that for broilers on CBF. At 10 weeks the average body weight of CBF + 15 % FFSBM was 13.78 %, 5.50 %, 4.30 % and 9.15 % lower than the value for CBF, CBF + 20 % FFSBM, CBF + 25 % FFSBM, CBF + 30 % FFSBM respectively.

Average daily gain for the five treatments is presented in table 1. The average daily gain obtained in this study for all levels of feeding arc lower than an average daily gain value of 132. 10g reported by Owen (2005). Such differences may be attributed to genetic constitution of broiler (Herkelman *et al.*1993; Leeson *et al.* 1997; Han and Parson, 2001; Reddy, 2006).

The results of this study showed that broilers birds fed CBF, CBF+ 15 % FFSBM, CBF + 20 % FFSBM, CBF + 25 % FFSBM and CBF + 30 % FFSBM had gained an average rate of 114.25 g, 99.3 I g, 103.66 g, 104.47 g and 108.31 g daily respectively during the study period. The results showed that growth rate increased with age of the birds similar to the body weight. At 10 weeks, the rate of gain of broiler birds fed CBF, CBF + 15 % FFSBM, CBF + 20 % FFSBM, CBF + 25 % FFSBM and CBF + 30 % FFSBM increased rapidly from 206.3 g to 245.4 g. This growth pattern revealed that broiler birds on these treatments would reached a point of inflection in body weight as they grow of age. This would suggest that for growing broilers meant for meat, 10 weeks of age should be the economic market age. Williams and Payne (1998) observed that weight gain in broiler birds increase weekly from the first week and reaches a maximum at about 10 weeks after which it will decline. This early growth trend in broiler birds is advantageous in meat-animal production as broiler birds get to market earlier than cockerel thus reducing production cost,

Daily rate of gain for broiler birds on CBF + 15 % FFSBM treatment showed an increasing trend till the 10th week, though the average value is significantly lower than the other treatments. Average daily rate of gain for broiler birds on CBF + 15 % FFSBM was 18.76 %, 6.72 %, 6.15 % and 11.78 % lower than the value for CBF, CBF + 20 % FFSBM, CBF + 25 % FFSBM and

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CBF + 30 % FFSBM respectively. The slower growth rate could be as a result of the low level protein intake. This suggests that inadequate protein intake would delay maturity in broilers. Owen (1985) stated that adequate protein requirement of broilers will provide enough nutrient to enhance body maintenance and growth. On the other hand, rapid growth rate observed in CBF + 30 % FFSBM level was due to high percentage FFSBM level being fed to this group of broiler birds. It was also observed that male broilers on CBF + 30 % FFSBM treatment showed well developed comb and wattle by the 10th week. This would suggest that adequate FFSBM feeding induces early sexual maturity in poultry birds.

However, the mean daily gain of 245.40 g (CBF) recorded in this study for the 10 weeks period was 5.42 % higher than 232. I g reported by Owen (2005). The result showed (Table 1) a non-significant (P >0.05) difference in growth rate among the four treatments, indicating that broiler birds on CBF + 30 % FFSBM were most efficient in converting FFSBM and mash to body weight. Represented on Table 2, is the average weekly quantities of mash and FFSBM consumed based on the various percentages. Expectedly, there were significant (P<0.05) differences among the levels of FFSBM.

Mean CBF and FFSBM intake for the different treatments, CBF, CBF + 15 % FFSBM, CBF + 20 % FFSBM, CBF + 25 % FFSBM and CBF + 30 % FFSBM level from 6-10 weeks of age were 1942,44 g, 1007,05 g, 1623.51 g, 1723.86 g and 1827.89 g respectively. These gave cumulative intake values of 9712.22 g (CBF) 8035.24 g (CBF + 15 % FFSBM), 8122.55 g (CBF + 20 % FFSBM), 8619.30 g (CBF + 25 % FFSBM) and 9139.43 g (CBF+ 30 % FFSBM). This also shows a lower cost of production for CBF + 25 % FFSBM broilers compare to CBF and CBF + 30 % FFSBM. Result showed that economically 25 % FFSBM supplementation in a mixed - feeding regime for growing broilers will be more profitable than higher levels of 30 % FFSBM. This is so because broilers on CBF + 30 % FFSBM group would consume more feed to maximize performance in terms of gaining more calories that would maintain the body and growth.

The total mash intake value obtained in this study for CBF 25 % FFSBM (8619.30 g) was lower than 9139.43 g and 9712.32 g for CBF + 30 % FFSBM and CBF but higher than that of CBF + 15 % FFSBM and CBF + 20 % FFSBM.

CONCLUSION

Results from this study indicate that broiler birds on CBF, CBF + 15 % FFSBM, CBF + 20 % FFSBM, CBF + 25 % FFSBM and CBF + 30 % FFSBM were not statistically (P >0.05) different in body weight at 10 weeks. Similarly, the four treatment groups CBF + 15 % FFSBM, CBF + 20 % FFSBM, CBF + 25 % FFSBM and CBF + 30 % FFSBM were not significantly (P >0.05) different in rate of body weight gain. However, the groups were significantly better than CBF + 15 % FFSBM in both parameters. Although there was significant (P <0.05) difference in terms of average daily feed intake among CBF, CBF + 20% FFSBM, CBF + 25 % FFSBM and CBF + 30 % FFSBM. Broilers on CBF + 25 % FFSBM were found to be comparatively most efficient in the conversion of feed into body tissues among the four treatments. This suggests a lower production cost at 25 % FFSBM supplement than the 15 % FFSBM, 20 % FFSBM and 30 % FFSBM. Results from this study showed that is in a mixed-feeding regime of commercial broiler finisher with full-fat soyabean meal up to 25 % FFSBM will induced fast growth, early attainment of market age and early sexual maturity in male broiler binds. It

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can therefore be concluded that 25 % FFSBM level in a mixed-feeding regime was the optimum for growing broilers.

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APPENDIX

Table 1: Average weekly body weight and Daily Rated of Gain % of Experimental Broiler chickens.

Age (weeks)	CBF (Control)	CBF + 15 %FFSBM	CBF + 20 % FFSBM	CBF + 25 % FFSBM	CBF + 30 % FFSBM
5 (Initial) g	901.20	857.80	868.90	887.40	898.30
6 B.W(g)	1061.40	1001.30	1012.60	1038.60	1059.60
ADG	22.89	20.50	20.53	21.60	23.04
7 B.W.(g)	1196.10	1150.60	1156.40	1182.40	1178.60
ADG(g)	42.13	41.83	41.07	42.14	40.04
8 B.W(g)	1609.20	1470.70	1478.50	1541.20	1521.40
ADG (g)	101.14	87.50	87.09	93.40	89.01
9 B.W (g)	2019.00	1840.80	1923.10	1902.70	2010.30
ADG(g)	159.69	140.42	150.60	145.04	158.86
10 B.W(g)	2619.00[a]	2301. 90[a]	2401.80[a]	2428.60[a]	2512.50[a]
	± 1.05	± 1.02	±1.03	±1.03	± 1.04
ADG (g)	245.40	206.30	218.99	220.17	230.60
XADG (g)	1 14.25[a]	99.3 l[b]	103,66[a]	104.47[a]	108.31[a]
	±1.50	±1-40	± 1.46	± 1.20	± 1.30

a, b, means of the same row of superscript showed significant (P<0.05) difference

Table 2: Average Weekly feed intake of experimental broiler Chickens

Age (Weeks)	CBF (Control	CBF + I5 %FFSBM (g)	CBF + 20 % FFSBM	CBF + 25%FFSBM (g)	CBF + 30%FFSM (g)
6	1062.46	996.70	958.37	986.43	1008.02
7	1492.37	1000.00	1010.50	1034.08	1224.15
8	1633.89	1362.90	1347.72	1446.39	1593.56
9	2214.60	1928.40	1867.80	1987.40	2106.90
10	3308.90	2747,24	2838.16	3165.00	3206.80
Average Weekly intake	1942.44	1007.05	1624.51	172.86	1827.89
Average Daily intake	277.49	229.58	232.07	246.27	261.13
Cumulative intake	9712.22	8035.24	8122.55	8619.30	9139.43

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