EFFECT OF VARYING INCLUSION LEVELS OF ACID SOAKED CAJANUS CAJAN SEED ON CARCASS CHARACTERISTICS OF BROILER FINISHER

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Abstract

A total of ninety (90) day old broiler were used for the study to determine the carcass characteristics of broiler finisher fed acid soaked Cajanus cajan seed meal diet. The birds were randomly assigned into 3 dietary treatments of 30 birds consisting of 3 replicate of (10) birds per replicates in a completely randomized design experiment. The seeds used were purchased from Towobowo Market in Igboora. The raw pigeon pea seeds were pre-treated by soaking at the rate of 1kg/3L of water for 12 hours after which the soaked seeds were soaked at the rate of 1kg/3L of raw pap water filtrate for 24 hours, initial and final pH was taken. The sample was sundried for 3days, milled and then included in the diet accordingly. Birds on T1 received the control diet, T2 received 20% level of pigeon pea, while T3 received 40% level of pigeon pea. The experiment lasted for eight weeks. At the end of the 8 weeks three (3) birds per treatment were sacrificed for carcass analysis. Results showed that there were significant (P>0.05) difference in the live weight, dress weight, plucked weight, dress, neck, wing, shank, thigh muscle, drum stick, breast muscle, and back, while there was no significant (P<0.05) difference in the head. However, birds on T2 recorded the highest value of the live weight (2130.70g), dress weight (1924.30g), plucked weight (206.30g), neck (4.30g) and drum stick (11.34%) while T3 recorded the lowest value of live weight (1865.70g), dress weight (1682.30g), plucked weight (183.30g), dress % (90.20%), thigh muscle (10.67%), drum stick (10.61%), breast muscle % (24.67%), and back % (10.90%). Birds on T1 recorded the highest value of dress percentage (91.10%), shank (4.96%), thigh muscle (11.46%) and breast muscle (25.90%) however, bird on T1 recorded the lowest value of back (10.68%). It can be concluded that pigeon pea soaked in acidic medium can be fed to birds at 20% inclusion level without having any adverse effects on the birds.

Key word: Carcass, Broiler, Replicate, Pigeon pea.

Introduction

Poultry production is an important rapid growing money making industry. However, one of the major problems of poultry producers is the high cost of feed, which arises mainly from the competition between man and animal for conventional feedstuffs like maize, groundnut cake, soybean meal and fish meal (Amaefule and Obioha, 2005). Competition for these feed items (especially protein feeds such as soya bean) increases the price, leading to high cost of production and hence poultry products. Soya bean is an oil seed legume, high in protein (44-47% crude protein) and forms the major source of plant protein for non-ruminants mainly poultry, constituting 20-30% in poultry ration (Opara and Okorie, 2015). The over dependence on soyabean as major protein source for monogastric animal feeding and industrial purposes has increased its scarcity and consequent high cost of production. There is need to investigate into some other legume seeds that are rich in protein and have the potential to either partially or wholly replace soyabean in poultry ration

One of such unconventional legumes capable of substitution expensive soyabean is pigeon pea. Pigeon pea has a protein content of between 20- 29% however the seeds like other legume seeds contain Anti-Nutritional Factors (ANFs) such as protease trypsin and chymotrypsin inhibitors and haemaglutinins (Carlini and Udedibie, 1997). However several processing methods such as boiling,

toasting, roasting, soaking (Akintunde *et al*., 2010) had been used to inactivate these antinutritional factors

Materials and Methods

Experimental site: The experiment was carried out at the Teaching and Research farm, Oyo State College of Agriculture, Igboora in the derived Savannah zone of Nigeria. The college is located on $7^0$15N and 303^0E of the equator with average annual rain fall 1278mm and average temperature of 20C.

Collection of sample: Pigeon pea was purchased from Towobowo market in Igboora.

Pre-treatment of seed: Raw pigeon pea seeds were soaked at the rate of1kg/3L of water for 12 hours.

Treatment of sample: The soaked seeds were soaked at the rate of 1kg/3L of raw pap water filtrate for 24 hours, initial and final pH was taken. The sample was sundried for 3days, milled and then included in the diet accordingly.

pH range	CCSO
Initial pH	3.8
Final Ph	4.6

CCSO- *Cajanus canjan* soaked in ogi liquor

Experimental diets: A total of ninety birds were used for the study, they were randomly assigned into 3 dietary treatments of 30 birds consisting of 3 replicate often (10) birds per replicates in a completely randomized design experiment. Birds on T1 received the control diets; T2 received 20% level of pigeon pea, while T3 received 40% level of pigeon pea. The experiment lasted for eight weeks.

Table 1: Gross composition of experimental animal diets

Ingredient	T_1 (0%)	T_2 (20%)	T_3 (40%)
Maize	58.00	49.23	40.46
Soyabean	27.00	21.60	16.20
Cajanus cajan	0.00	14.17	28.34
Wheat offal	10.00	10.00	10.00
Bone meal	2.00	2.00	2.00
Lime stone	2.00	2.00	2.00
Lysine	0.25	0.25	0.25
Methionine	0.25	0.25	0.25
Salt	0.25	0.25	0.25
Broiler premix	0.25	0.25	0.25
TOTAL	100.00	100.00	100.00
M.E (Kcal/kg)	3005	3014.36	3023.32
Crude protein (%)	21.75	20.80	19.86

M. E- Metabolizable energy

Carcass Analysis: Three birds per treatment were selected and slaughtered. The carcass part were cut which include (live weight, dress weight, head, neck, wing, shank, thigh muscle, drum stick, breast muscle and back) and are weighed and express as percentage of live weight,

Statistical analysis: Following the experimental design, all data collected were subjected to statistical analysis of variance (ANOVA) using SPSS version 17 and means separated by Duncan Multiple Range Test.

Result and Discussion

Table 2: showed the carcass characteristics of broiler finisher fed acid soaked *Cajanus cajan* seed meal diet. There were significant (P>0.05) difference in the live weight, dress weight, plucked weight, dress, neck, wing, shank, thigh muscle, drum stick, breast muscle, and back, while there was no significant (P<0.05) difference in the head. However, birds on T2 recorded the highest value of the live weight (2130.70g), dress weight (1924.30g), plucked weight (206.30g), neck (4.30g), and drum stick% (11.34%). While T3 recorded the lowest value of live weight (1865.70g), dress weight (1682.30g), plucked weight (183.30g), dress % (90.2%), thigh muscle% (10.67%), drum stick % (10.61%), breast muscle % (24.67%), and back % (10.90%). Birds on T1 recorded the highest value of dress percentage (91.10%), shank (4.96%), thigh muscle (11.46%) and breast muscle (25.90%). However, bird on T1 recorded the lowest value of back % (10.68%).

Table 2: Carcass characteristics of broiler finisher fed acid soaked *Cajanus cajan* seed meal diet

Parameters	T1 (0%)	T2 (20%)	T3 (40%)	SEM
Live weight	2082.30[a]	2130.70[a]	1865.70[b]	66.52
Dress weight	1897.30[a]	1924.30[a]	1682.30[b]	62.51
Plucked weight	205.00[a]	206.30[a]	183.30[b]	6.09
Dress %	91.10[a]	90.30[b]	90.20[b]	0.23
Head %	2.96	2.99	2.96	0.008
Neck %	3.76[b]	4.30[a]	4.28[a]	0.14
Wing %	8.90[a]	7.57[b]	8.90[a]	0.36
Shank %	4.96[a]	3.75[b]	4.54[a]	0.29
Thigh muscle %	11.46[a]	10.82[b]	1067[b]	0.20
Drum stick %	11.05[a]	11.34[a]	10.61[b]	0.17
Breast muscle %	25.90[a]	25.27[a]	24.67[b]	0.29
Back	10.68[b]	11.06[a]	10.90[b]	0.09

a,b,c,d; Means on the same rows with different superscript differ significantly (P<0.05)

Table 3: Anti-nutritional factor content of raw and processed pigeon pea

Anti-nutritional factors	Raw	Processed	Percentage reduction
Saponin	0.287	0.242	15.0
Tannin	0.026	0.014	46.15
Trypsin inhibitors	28.74	26.87	6.50
Oxalate	0.117	0.082	29.9

Discussion

There were significant ($P < 0.05$) difference in the values recorded for final live weight, dressed weight, Plucked weight and dressed percentage of broiler fed experimental diets across the treatment. The result of this study confirmed the findings of Fanimo *et al.* (2003) who reported heavier birds produced a greater eviscerated yield. The result of this study showed that highest dressed weight was observed in the broiler fed diet. The lowest back weight was obtained in diet 1 could be attributed to different abilities of the diets to differently induce tissue lay down for the said cut part. That the poorer back cavity for bird fed diet 1 could be attributed to different abilities of the diets to differently induce tissue lay down for the said cut part.

The decrease in the breast muscle, dress percentage, Drum stick and thigh muscle in treatment 3 was an indication that nutrient required for tissue synthesis were not sufficient. This could be attributed to poor utilization of protein due to presence of anti-nutritional factor such as Tannin. Tannin is reported to form complexes with dietary protein as well as endogenous protein including enzymes and this may inhibit the action of proteolitic enzymes from undergoing normal metabolism of proteins. Mathew *et al.* (2010) Reported that higher percentage of breast muscle indicated better protein utilization by birds

Conclusion

It could be concluded that pigeon pea soaked in pap water filtrate can be fed to birds at 20% level of inclusion without having any negative effect on the carcass characteristics of broiler fed experimental diet.

Recommendation

Feeding up to 40% level of inclusion showed fairly good result, however, there is need for adoption of other processing methods to further reduce the level of anti-nutritional factors in legumes seed

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