THE CARCASS CHARACTERISTICS AND INTERNAL ORGANS OF BROILER CHICKENS FED FERMENTED BAOBAB (*ADANSONIA DIGITATA*) SEED MEAL

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ABSTRACT

This research was conducted to determine the carcass characteristics and internal organs of broiler chickens, fed fermented baobab (Adansonia digitata) seed meal (FBSM). The feeding trial was conducted at Dan-Agro Farm, a Sub-sidiary of Dan-Agro Products, located at Zawan, Jos-South Local Government Area, Plateau State, Nigeria. Five (5) treatment diets were used for the experiment. T1 is the control while diets T2, T3, T4 and T5 contained 12 % inclusion levels of (FBSM) for 0, 48, 72 and 96hrs, respectively. A total of 240 one day old Arbor Acres broiler chicks were raised in a deep litter system and allotted five experimental diets, replicated four (4) times in a completely randomized design. Each replicate had 12 chicks of 48 chicks per treatment. At 8weeks old, two (2) broiler chickens from each replicate (n = 40) were randomly selected, weighed, slaughtered for the carcass and internal organ analysis. Carcass characteristics were not significantly (P<0.05) affected by dietary treatments. Dietary treatments had no significant (P>0.05) effect on internal organs, except on length of intestine. In conclusion, since the average live weight of chickens fed FBSM, ranged 1.96 – 2.22 kg/bird, a value within the recommended live weight 1.6 - 1.8 kg/bird. This suggested that baobab seed meal has potentials for use as a source of protein to produced broiler chicken to table size.

Keywords: Broiler chickens, Baobab, fermentation, carcass and internal organs.

INTRODUCTION

The recent hike in the cost of convention feed ingredients is a major factor affecting poultry business, It was estimated that 70-75% cost of broiler production is attributed to feed cost (Okpe and Sule, 2022). However any reduction in cost of production of such ingredients will make protein cheaper and available for human consumption (Odey *et al*., 2019). Baobab (*Adansoniadigitata*) seed do not only serve as protein source (Assogbadjo *et al*. 2012) but also important source of vitamin C (Manfredini*et al.,* 2002) and essential amino acid (Osman, 2004). In Korea, the average slaughter age of broiler chicken has been reported at 31.8-32.8 days and their slaughter weight was 1.68-1.74kg (KREI, 2020). This performance may be attributed to decrease in feed conversion ratio and increased in daily weight gain (Kim *et al.,* 2019). However these records may not be visible with the use of nonconventional feed stuffs, due to the daunting challenges of anti-nutrition factors present, therefore need some forms of processing (fermentation) to reduce their effect on animal performance. Broiler chickens can consume non-conventional feed ingredients that cannot be directly consumed by man into high quality meat (Odey *et al*., 2019). The objective of the present study was to determine the carcass characteristics and internal organs of broiler chickens fed *FBSM*.

MATERIALS AND METHODS

The baobab seeds were divided into four (4) equal parts. The first part was left unfermented (UBSM); the 2nd, 3rd and 4th parts were soaked for 24hours and left to ferment for 48hrs, 72 and 96hrs (FBSM), respectively as described by Tuleun *et al*. (2011). Then sun-dried, and then milled before chemical analysis and inclusion in the test diet.

Experimental Diets

There were five (5) treatments, each replicated four (4) times: T1- Is the control diet. T2- Diet containing 12% unfermented baobab seed meal (UBSM). Diets- T3, T4 and T5 contained 12% baobab seeds fermented (FBSM) for 48, 72 and 96hrs, respectively. The chemical composition of each dietary

treatment was analyzed according to AOAC, (2006) techniques. The diets were iso-caloric and iso-nitrogenous as presented in table 1:

Experimental animals and design

A total of 240 one day-old Arbor Acres broiler chicks were used for the experiment. Birds were randomly allotted to the five (5) dietary treatments replicated four (4) times, in a completely randomized design. Each replicate had twelve (12) chicks, having 48 chicks per treatment.

Table 1: Proximate Composition and Metabolizable Energy of Broiler Finisher Diets Containing Baobab Seed Meal

Nutrient	Experimental Diets					SEM
	T1 Control	T2 0hr FBSM	T3 48hrs FBSM	T4 72hrsFBSM	T5 96hrs FBSM	
DM	93.13[a]	92.69[b]	92.05[c]	91.76[d]	90.96[e]	0.17*
CP	20.58[b]	22.00[a]	21.75[b]	22.60[a]	22.83[a]	0.24*
EE	5.37[d]	5.21[e]	7.62[a]	6.14[b]	5.787[c]	0.20*
ASH	10.17[c]	10.97[abc]	11.07[ab]	10.45b[c]	11.38[a]	0.15*
CF	10.15[b]	9.34[c]	8.80[d]	10.57[a]	10.72[a]	0.17*
NFE	60.15	58.80	56.20	57.87	58.23	0.58ns
MEkcal/kg	3332.29	3276.57	3375.65	3322.68	3308.18	15.44ns

[a,b,c,d,e] Means with different superscripts are significantly($P<0.05$) different across rows, *($P<0.05$),SEM = Standard error of means, CD = Control diet T1 = Control diet without baobab seed meal, T2 = Diet containing unfermented baobab seed, T3 = Diet containing baobab seeds obtained after 48h fermentation. T4 = Diet containing baobab seeds obtained after 72h fermentation, T5 = Diet containing baobab seeds obtained after 96h fermentation, FBSM = Fermented baobab seed meal, h = Hours, DM = Dry matter, EE = Ether extracts, CF = Crude fibre, NFE = Nitrogen free extract, ME (kcal/kg), (Metabolizable energy = 37 x % CP + 81.1 x % EE + 35.5 x % NFE by Pauzenga equation (1985).

Carcass Characteristics of Broiler Chickens

At the end of the experiment, 40 broiler birds were selected, slaughtered for carcass analysis. The head, neck, wings, back, chest, thigh, drumstick and shank were recorded. Also recoded were weights of gizzard, heart, liver, pancreas, kidney, lungs, spleen, visceral and abdominal fat. The meat yield was calculated as describe by (Carew *et al*., 2011).

a). Dressing percentage:

This was calculated as dressing (%) = $\frac{\text{Dressed weight (g)}}{\text{Live weight (g)}} \times 100$

b). Carcass proportions:

Calculated and expressed in percentage (%) = $\frac{\text{weight of component part (g)}}{\text{dressed weight (g)}} \times 100$

Result and DISCUSSION

Carcass Characteristics of Chickens

Carcass weight of chickens expressed as percentage live weight is presented in Table 2. Live weight, dressed weight, dressing percentage and cut-up parts were not significantly ($P<0.05$) affected by dietary treatments. Dressing percentage in this study ranged from (68.34 -71.94%) between bird fed test diets higher than those fed the control diets (65.97%). The results of this study is consistent (68.34 - 71.61%) with the findings of Mustapha *et al*. (2015) who fed 72hrs fermented castor seed meal to broiler chickens, and the values of this study is within the dressing percentage (66.37 - 70.19%) reported by Tuleun *et al*. (2011) of broiler chickens fed 48hrs fermented mucuna seed meal diets. The yield of cut-up parts expressed as percentage live weight in this study includes wings, thigh, drumstick, breast and back are 8.62, 14.70, 11.95, 18.88 and 17.65% respectively were higher than values reported by Mustapha *et al*. 2015 whose values were similar to those reported by (Ashom *et al*., 2014; Tuleun *et al*., 2011; Aguihe *et al*., 2017 and Chisoro *et al*., 2018) respectively.

Table 2: Effect of fermented Baobab Seeds on Carcass Characteristics of Broiler Chickens.

Parameter (In Percent Dressed weight)	Experimental Diets T1 CD	T2 0hrs FBSM	T3 48hrs FBSM	T4 72hrs FBSM	T5 96hrs FBSM	SEM
Live weight (g/bird)	2412.05	2212.50	1962.50	2225.00	2012.50	63.98^{ns}
Dressed weight (g/b)	1587.50	1512.50	1412.50	1575.00	1400.00	56.37^{ns}
Dressing (%)	65.97	68.34	71.94	70.89	69.77	1.93^{ns}
Head (%)	3.87	3.65	2.85	3.41	3.72	0.21^{ns}
Neck (%)	7.82	7.24	7.24	7.21	7.68	0.25^{ns}
Shank (%)	5.62	4.59	4.92	4.62	4.79	0.24^{ns}
Wings (%)	11.37	9.82	10.20	10.71	10.72	0.36^{ns}
Thigh (%)	20.16	18.41	17.92	17.88	19.71	0.66^{ns}
Drum stick (%)	16.36	14.74	14.27	14.51	14.59	0.43^{ns}
Breast (%)	35.40	32.28	29.14	30.40	28.07	1.13^{ns}
Back (%)	18.68	18.87	18.33	16.67	18.91	0.63^{ns}

a,b,c, Means with different superscripts are significantly($P<0.05$) different across rows, ns Not significantly different ($P>0.05$), SEM = Standard error of means, CD = Control diet T1 = Control diet without baobab seed meal, T2 = Diet containing unfermented baobab seed, T3 = Diet containing baobab seeds obtained after 48h fermentation. T4 = Diet containing baobab seeds obtained after 72h fermentation, T5 = Diet containing baobab seeds obtained after 96h fermentation, FBSM = Fermented baobab seed meal, hour = Hours,

Visceral organs

The internal organ weight of broiler chickens expressed as percentage live weight is presented in Table 3. Dietary treatments had no significant ($P>0.05$) effect on proventriculus, gizzard, intestinal weight, heart, liver, lungs, pancreas, kidney, and spleen investigated, except on length of intestine. Agrees with the findings of Carew *et al*. (2003) who reported that the inclusion of unprocessed (raw) velvet beans (*Mucuna pruriens*) led to a significant ($P<0.05$) increase in small and large intestinal length of broiler chickens.

Table 3: Effect of Inclusion of Baobab Seed Meal on Visceral Organs of Broiler Chickens

Parameter % of Live Weight	Experimental Diets T1 CD	T2 0hr FBSM	T3 48hrs FBSM	T4 72hrs FBSM	T596hrs FBSM	SEM
Live weight (g/bird)	2412.05	2212.50	1962.50	2225.00	2012.50	63.98^{ns}
Intestinal length (cm)	237.00^{ab}	249.75^{a}	227.00^{b}	256.13^{a}	225.00^{b}	3.99*
Proventriculus (%)	0.47	0.45	0.49	0.43	0.48	0.02^{ns}
Full gizzard (%)	2.65	2.81	2.93	3.02	3.06	0.08^{ns}
Empty gizzard (%)	1.61	1.58	1.80	1.69	1.80	0.05^{ns}
Intestinal weight (%)	5.46	6.27	6.71	5.86	6.15	0.16^{ns}
Visceral fat (%)	0.33	0.16	0.16	0.50	0.15	0.08^{ns}
Abdominal fat (%)	0.62	0.93	0.87	0.75	0.75	0.12^{ns}
Heart (%)	0.50	0.52	0.66	0.54	0.58	0.02^{ns}
Liver (%)	2.25	2.18	2.83	2.34	2.23	0.09^{ns}
Pancreas (%)	0.35	0.33	0.31	0.35	0.30	0.02^{ns}
Kidney (%)	0.70	0.73	0.79	0.74	0.78	0.02^{ns}
Lungs (%)	0.72	0.74	0.80	0.78	0.75	0.03^{ns}
Spleen (%)	0.16	0.16	0.17	0.15	0.12	0.01^{ns}

a,b,c, Means with different superscripts are significantly($P<0.05$) different across rows, ns Not significantly different ($P>0.05$), SEM = Standard error of means, CD = Control diet T1 = Control diet without baobab seed meal, T2 = Diet containing unfermented baobab seed, T3 = Diet containing baobab seeds obtained after 48h fermentation. T4 = Diet containing baobab seeds obtained after 72h fermentation, T5 = Diet containing baobab seeds obtained after 96h fermentation, FBSM = Fermented baobab seed meal, hrs = Hours.

CONCLUSION

The result of this study showed that there were no significant ($P<0.05$) differences in the carcass characteristics and internal organs of broiler chickens across the treatments on intestinal length.

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