GSAR Journal of Agriculture and Veterinary Sciences
ISSN: 3048-9075 (Online)
Abbreviated key title: Glob.J. Agri.Vet.Sci.
Frequency: Monthly
Published By GSAR Publishers
Journal Homepage Link- https://gsarpublishers.com/journal-gjavs-home/

EFFECT OF *Sacoglotis gabonensis* BARK MEAL ON THE CARCASS AND INTERNAL ORGAN CHARACTERISTIC OF BROILER CHICKENS

By

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Article History

Received: 10/05/2026
Accepted: 15/05/2026
Published: 17/05/2026

Vol – 3 Issue –5

PP: -14-19

Abstract

The experiment was carried out to investigate the effect of Sacooglotis gabonensis bark meal (SGBM) on the carcass quality and internal organs characteristic of broiler chickens. A total of one hundred and fifty day old cobb 500 chicks were randomly assigned to five dietary treatment containing 30 chicks each. Each treatment was replicated three times with ten birds each. The experiment was arranged in a completely randomized design(CRD).Five diets were formulated to represent (T1-T5),Treatment 1(T1) served as the control diet containing no SGBM, while T2,T3,T3 and T5 contained 0.5,1.0,1.5 and 2.0 % respectively. The formulated diet were fed to the birds from the pre starter phase(week1-3) through the starter phase(week 4-5) and the finisher phase(week 6-8).Bird were allowed access to water and feed ad libitum. Parameters measured for the carcass were live weight, stunned weight, dressed weight, dressing %,drum stick %,thigh %,back %, breast %, wing % and head % while the internal organs parameters measured were crop, proventiculus, empty gizzard, small intestine weight, spleen , pancreas ,large intestine weight, liver, bile volume, abdominal fat, lungs ,heart, kidney and caecum. At the end of the feeding trial, result showed that on the carcass, there was no significant differences (p>0.05) in all the carcass parameters measured across the various treatment and except for the abdominal fat there were equally no significant differences in the internal organs indicating that SGBM did not exert any negative effect on the birds.

Keywords: *Broiler chickens, Pre starter to finisher phases, Sacooglotis gabonensis bark meal (SGBM) , Carcass quality and Internal organs.*

INTRODUCTION

The poultry industry has been indicted with the use of various antibiotics in improving the growth and performance of birds. According to Chattopadhyay, (2014), Antibiotics can be used at sub-therapeutic dosages in poultry production to support growth and safeguard health of birds.Most of the antibiotics exert their effect by the transformation of the immune status of broiler chicken (Lee *et al*., 2012). This benefit is not without consequences as antibiotics resistance has been reported widely alongside its residue in animal products.

Kummerer, 2009 noted antibiotics residues in livestock production have adverse effect on human health and further stated that tetracycline for instance impede teeth growth in young children. This is similarly the situation with beta-agonists, like clenbuterol, leading at times to food poisoning and muscle tremors, palpations and tachycardia (Chan, 1999).

This development has resulted in an intense search of natural replacement of antibiotics which will still promote growth and enhances performance.

Phytogenic feed additive (PFA) which are mainly derived from plants in the form of herbs and spices are used to expand animal performance. They have been very effective because of their encouraging effects on growth, enhanced immune system and decreased stress response. Ghasemi *et al*., (2014) reported that recent outcomes indicates that PFA are good substitutes for antibiotics *Sacooglotis gabonensis* is plant that has been widely use in Nigeria in the areas of traditional medicine and other relevant fields because of its richness in phytochemicals, minerals and vitamins.

Elijah *et al.* (2010) reported on the use of *Sacoglottis gabonensis* in the preservation of palm wine and reported that there was a significant increased (P<0.05) in vitamin C content of palm wine treated with *Sacoglottis gabonensis*

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while by Maduka *et al.*(2004) reported that it contains both e ssentialand non essential amino acids: lysine, leucine ,histidine, tyrosine, valine, phenylalanine,isoleucine, arginine, aspartate, serine, glutamine, cysteine and alanine. This study was, therefore necessary to determine the effect of *Sacooglotis gabonensis* as an alternative to antibiotics on the carcass and internal organs of broiler chickens.

MATERIALS AND METHODS

Experimental site

The study was carried out at the Teaching and Research farm of the Department of Animal Science, University of Uyo, Uyo, Nigeria. Uyo lies between latitude $4^0 31^{'}$E and $45^0 31$'N and $4^0 45$'N and longitude $7^0 31$'E and $45^0 351$'E. The altitude of the area is 38 m above sea level and a mean rainfall of 2000 mm. (Meteorology Station, University of Uyo, Uyo, Nigeria).

Processing of Test Materials

The fresh bark of *S. gabonensis* was purchased from Ikot Ambang market, Uyo, Akwa Ibom State. The bark was scrapped, washed to remove dirt and sand after which it was air dried at room temperature for a week, milled and stored in an air tight container until use.

Experimental Diets

Five experimental diets each were formulated for the pre-starter (0-3 weeks), starter (4-5 weeks), finisher (6-8 weeks) phases of the broiler chickens

Diet 1 served as control with no SGBM (0%).

Diet 2, 3, 4 and 5 contained 0.5, 1.0, 1.5 and 2.0% of SGBM respectively in broiler diet as shown below:

Treatment 1: Diet without *S. gabonensis* stem bark will serve as control

Treatment 2: Diet with 5 g/kg of feed (0.5%)

Treatment 3: Diet with 10 g/kg of feed (1%)

Treatment 4: Diet with 15 g/kg of feed (1.5%)

Treatment 5: Diet with 20 g/kg of feed (2.0%)

Broilers diets contained maize, soya bean meal, palm kernel cake, Wheat offal, SGBM, fish meal, palm oil, bone meal, lysine, methionine, salt and vitamin premix as presented in tables 1,2 and 3..

Table 1: Ingredient Composition of Experimental Diets with SGBM Fed to Broiler Starter Chicken (0-3weeks)

Treatment	**1**	**2**	**3**	**4**	**5**
Levels of SGBM(%)	**0**	**0.5**	**1.0**	**1.5**	**2.0**
Ingredients					
Maize	57.00	58.00	58.00	57.00	57.00
Soya bean meal	31.00	31.00	31.00	31.00	30.00
Palm Kernel Cake	1.5	0.8	0.4	1.0	0.9
Wheat Offal	1.5	0.5	0.5	0.3	0.8
Fish Meal	4.00	4.00	4.00	4.00	4.00
Palm Oil	1.0	1.2	1.1	1.2	1.3
Bone Meal	3.00	3.00	3.00	3.00	3.00
SGBM	0	0.5	1	1.5	2.0
Salt	0.25	0.25	0.25	0.25	0.25
L-Lysin	0.25	0.25	0.25	0.25	0.25
DL-Methionine	0.25	0.25	0.25	0.25	0.25
Premix	0.25	0.25	0.25	0.25	0.25
Total	100	100	100	100	100
Calculated Nutrient Composition of Broiler Pre Starter Diets:					
Crude Protein	23.1	23.1	23.0	23.1	23.0
Metabolizable Energy	3200	3201	3201	3197	3198
Crude Fibre	3.19	3.20	3.27	3.43	3.54
Ether Extract	7.56	7.56	7.89	7.57	7.56
Calcium	1.47	1.48	1.47	1.48	1.48
Phosphorous	0.78	0.77	0.77	0.77	0.77
Methionine	0.35	0.35	0.36	0.36	0.37
Lysine	1.14	1.14	1.15	1.16	1.17

1 kg of premix contains: Vitamin A (5,000,000 IU), vitamin D3 (1,000,000 IU), vitamin E (16,000 mg), vitamin K3 (800 mg), vitamins B_2 (22,000 mg), Niacin (22,000 mg), Vitamin B_{12} (10 mg), Folic Acid (400 mg) Biotin (32 mg), Chlorine chloride (200,000 mg), Zinc (32,000 mg) Iodine (600 mg), Cobalt

Table 2:Ingredient Composition of Experimental Diets with SGBM Fed to Broiler Starter Chicken(4-5weeks)

Treatment	1	2	3	4	5
Levels of SGBM(%)	0	0.5	1.0	1.5	2.0
Ingredients					
Maize	59.00	59.00	58.00	58.00	50.00
Soya bean meal	31.00	30.00	30.00	31.00	30.00
Palm Kernel Cake	1.5	1.6	1.6	1.4	1.2
Wheat Offal	1.6	1.5	1.5	1.3	1.0
Fish Meal	2.0	2.0	2.0	2.0	2.0
Palm Oil	1.5	1.5	1.7	1.7	1.5
Bone Meal	3.00	3.00	3.00	3.00	3.00

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SGBM	0	0.5	1	1.5	2.0
Salt	0.25	0.25	0.25	0.25	0.25
L-Lysin	0.25	0.25	0.25	0.25	0.25
DL-Methionine	0.25	0.25	0.25	0.25	0.25
Premix	0.25	0.25	0.25	0.25	0.25
Total	100	100	100	100	100
Calculated Nutrient Composition of Broiler Starter Diets					
Crude Protein	20.3	20.1	20.2	20.4	20.1
Metabolizable Energy	3199	3200	3208	3199	3198
Crude Fibre	3.16	3.28	3.37	3.44	3.50
Ether Extract	7.39	7.39	7.74	7.39	7.42
Calcium	1.54	1.54	1.54	1.54	1.54
Total Phosphorous	0.79	0.79	0.79	0.79	0.79
Methionine	0.32	0.33	0.33	0.34	0.34
Lysine	1.03	1.04	1.04	1.05	1.06

1 kg of premix contains: Vitamin A (5,000,000 IU), vitamin D3 (1,000,000 IU), vitamin E (16,000 mg), vitamin K3 (800 mg), vitamins B_2 (22,000 mg), Niacin (22,000 mg), Vitamin B_{12} (10 mg), Folic Acid (400 mg) Biotin (32 mg), Chlorine chloride (200,000 mg), Zinc (32,000 mg) Iodine (600 mg), Cobalt

Table 3:Ingredient Composition of Experimental Diets with SGBM Fed to Broiler Finisher Chicken(6-8weeks)

Treatment	1	2	3	4	5
Levels of SGBM(%)	0	0.5	1.0	1.5	2.0
Ingredients					
Maize	64.00	64.00	64.00	65.00	65.00
Soya bean meal	26.00	26.00	26.00	25.00	24.00
Palm Kernel Cake	0.90	0.50	0.50	0.20	0.70
Wheat Offal	0.90	0.50	0.50	0.20	0.50
Fish Meal	2.0	2.0	2.0	2.0	2.0
Palm Oil	1.3	1.3	1.3	1.3	1.3
Bone Meal	3.50	3.50	3.50	3.50	3.50
SGBM	0	0.5	1	1.5	2.0
Salt	0.25	0.25	0.25	0.25	0.25
L-Lysine	0.25	0.25	0.25	0.25	0.25
DL-Methionine	0.25	0.25	0.25	0.25	0.25
Premix	0.25	0.25	0.25	0.25	0.25
Total	100	100	100	100	100
Calculated Nutrient Composition of Broiler Finisher Diets					
Crude Protein	18.7	18.9	18.8	18.5	18.5
Metabolizable Energy	3205	3202	3205	3205	3199
Crude Fibre	2.93	3.00	3.05	6.79	6.66
Ether Extract	6.90	6.90	6.80	7.39	7.42
Calcium	1.53	1.53	1.53	1.53	1.53
Total Phosphorous	0.77	0.77	0.77	0.77	0.7
Methionine	0.31	0.31	0.32	0.33	0.32
Lysine	0.93	0.94	0.94	0.93	0.92

1 kg of premix contains: Vitamin A (5,000,000 IU), vitamin D3 (1,000,000 IU), vitamin E (16,000 mg), vitamin K3 (800 mg), vitamins B_2 (22,000 mg), Niacin (22,000 mg), Vitamin B_{12} (10 mg), Folic Acid (400 mg) Biotin (32 mg), Chlorine chloride (200,000 mg), Zinc (32,000 mg) Iodine (600 mg), Cobalt

Experimental Birds

A total of one hundred and fifty (150) day old chicks were randomly allotted to five dietary treatments with each group containing 30 birds of 10 birds per each of the three replicates.

On arrival, glucose was given to them to cushion the effect of stress on the birds while feed and water were served *ad libitum* throughout the experiment. Heat was provided by using kerosene stove and electric bulb to keep them warm throughout the brooding period and the birds were housed in a well ventilated house in a deep litter system. The vaccination schedule was adhered to while other routine management practices were observed accordingly.

Data Collection

At the end of the experiment, 6 birds per treatment were selected, two from each replicate. The birds were deprived of feed overnight but given water a day prior to slaughtering. The birds were weighed just before slaughtering. After weighing, the birds were slaughtered, bleed and immersed in hot water for 2 minutes to aid defeathering. After defeathering, the head, neck and shanks were cut off. The visceral organs (the liver, gizzard, pancreas, kidney, heart, proventriculus) were separated and weighed. After evisceration, the dressed weight was determined. Also parts of the carcass (cut – parts) - breast, thigh, back, wings, drumsticks, were cut, weighed and converted to percentage of live weight.

The following calculations were made:

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$$\text{Dressing \%} = \frac{\text{weight of dressed carcass}}{\text{Live weight}} \times \frac{100}{1}$$

$$\text{\% cut-parts} = \frac{\text{weight of cut - part}}{\text{live weight}} \times \frac{100}{1}$$

$$\text{'\% Internal organs} = \frac{\text{weight of internal organ}}{\text{Live weight}} \times \frac{100}{1}$$

Data Analysis

Data obtained from the study were subjected to one-way analysis of variance (ANOVA) using SPSS software while Duncan's Multiple Range Test of the same software was used for separation of means.

RESULTS AND DISCUSSION

Effect of SGBM on the Carcass cut of Finisher Broiler Chickens

Table 4 Carcass Cut (% live weight) of Finisher Broiler Chicken Fed Varying Dietary Levels of SGBM

Treatment	1	2	3	4	5	SEM	P value
Levels of SGBM (%)	0	0.5	1.0	1.5	2.0		
Parameters							
Live Weight (g)	2.033	1.850	1.766	1.800	1.733	0.059	0.600
Stunned weight (g)	1.883	1.800	1.683	1.716	1.683	0.045	0.637
Dressed Weight (g)	1.833	173 3	1.633	1.600	1.583	0.045	0.401
Dresssing (%)	90.433	93.666	92.733	89.100	91.666	0.838	0.495
Drum Stick (%)	10..653	9.656	10.720	10.750	11.723	0.296	0.321
Thigh (%)	11.623	10.183	11.766	10..490	11.433	0.346	0.552
Back (%)	12.580	14.586	48.420	14.726	54.763	10.301	0.578
Breast (%)	21.756	18.520	23.123	22.066	25.170	1.018	0.373
Wings (%)	8.696	13.586	9.186	8.776	8.456	1.04	0.547
Head (%)	4.5133	6.0733	4.9333	5.566	4.286	0.313	0.380

Mean values across rows were not significantly ($p>0.05$) different

In Table 3.4 the result of the carcass cut of finisher broiler is presented and it shows that there was no significant differences ($p>0.05$) in all the carcass parameters measured. This signifies that SGBM did not have any detrimental effect on the carcass cut of the finisher broiler chickens.

Though no significant differences was observed in live weight, stunned weight and dressed weight, the numerical value was highest in the control but in terms of dressing percentage, the highest numerical value was obtained at 0.5% inclusion level with a value of 93.666%.

Elijah *et al*.(2022) noted that there were no significant difference in all the carcass parameters measured across all the treatment in their work indicating that their test diet *Gongronema latifolium* did not have any negative effect on the carcass yield of the broilers and in the view of Agyo *et al* .(2025) which in their research with sweet potato leaf reported that replacing soya bean with different dietary levels of sweet potato leaf meal (SPLM) did not affect the live weight of the finisher broiler chickens and plucked weight, eviscerated weight, carcass weight and the dressing percentage as they were not significantly influenced by the dietary treatments.. Ayssiwede *et al*.(2011) in an experiment using *moringa* leaves, evaluated the outcome of including *Moringa* leaves in the diets of growing indigenous Senegal chickens up to 24% and concluded that it did not have any detrimental effect on the carcass and organs characteristics of the birds.

Effect of SGBM on the Internal organs of Finisher Broiler Chickens

Table 5 Internal Organs (% live weight)of Finisher Broiler Chicken Fed Varying Dietary Levels of SGBM

Treatment	**1**	**2**	**3**	**4**	**5**	**SEM**	**P value**
Levels of SGBM (%)	**0**	**0.5**	**1.0**	**1.5**	**2.0**		
Parameters							
Crop	0.3567	0.3533	0.3533	0.5200	0.4233	0.025	0.163
Proventiculus	0.327	0.4833	0.4000	0.4867	0.4567	0.029	0.408
Empty Gizzard	1.786	1.903	1.717	1.870	1.707	0.058	0.408

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Small Intestine weight	2.217[b]	2.723[a b]	3.163[a]	2.580[a b]	2.763[b]	0.107	0.055*
Spleen	0.93	0.90	0.25	0.70	0.57	0.039	0.579
Pancreas	0.16	0.16	0.21	0.11	0.16	0.016	0.479
Large Intestine weight	0.227[ab]	0.357[a]	0.220[a b]	0.142[b]	0.123[b]	0.028	0.037*
Liver	58.30	1.89	1.643	1.633	1.620	11.35	0.456
Bile Volume	0.122	0.125	0.77	0.93	0.100	0.008	0.420
Abdominal fat	1.03[b]	1.910[a]	1.220[b]	1.753[a]	1.260[ab]	0.119	0.060*
Lungs	0.460	0.420	0.380	0.380	0.530	0.037	0.754
Heart	0.483	0.450	0.450	0.440	0.453	0.012	0.881
Kidney	0.330[ab]	0.340[a b]	0.410[a b]	0.293[b]	0.457[a]	0.023	0.178
Caecum	0.483	0.450	0.450	0.440	0.453	0.012	0.881

[a-b] Mean values across rows with different superscript(s) are significantly ($p<0.05$) different the result of the internal organ characteristics of broiler finisher fed SGBM based diet is presented in table 3.5 and there were no significant differences in crop, proventriculus, empty gizzard, spleen, pancreas, liver, bile volume, lungs, heart and caecum but for the small intestine, treatment one(0%) and treatment five(2%) were statistically different from treatment three(1.0%) though they were all similar to treatment two(0.5%)and four(1.5%). For the large intestine, the inclusion of SGBM at 1.5% and 2.0% did not show any significant different amongst the two treatment but significantly different from 0.5% inclusion which was not significantly different from 0% and 1.0% which were not also significantly different from the 1.5% and 2.0%.the statistical differences observed in the abdominal fat was between 0% and 1.0% which were statistically different from0.5% and 1.5% which were not different from each other and also not significantly different from 2.0%.At 1.5% and 2.0%,there existed a significant differences between the two treatment though they were not significantly different from the 0%,0.5% and 1.0% inclusion of SGBM.

Agyo *et al* .(2025) in their research with sweet potato leaf reported that replacing soya bean with different dietary levels of sweet potato leaf meal (SPLM) did not affect the internal organ characteristics noting that lungs weight (0.41 - 0.56%), heart weight (0.38 - 0.44%), liver weight (1.74 - 1.92%) ,gizzard weight (2.54 -3.27%) ,kidney weight (0.03% - 0.04%) and abdominal fat weight (0.94 - 1.52%)all did not differ across the dietary treatment. Likewise, the pancreas weights (0.12 - 0.19%), small intestine weight (4.15 - 5.02%) and spleen weight (0.11 - 0.14%) were also not influenced by the dietary levels of SPLM.

The result of this study is in line with that of (Oloyele *et al*., 2010) and (Ironkwe *et al.,* 2012), who observed that there was no significant ($p>0.05$) variation between organs of birds fed oilseed meal, and concluded that from the result of their study, there were no significant ($p>0.05$) differences in the internal organs of birds fed Bambara nuts and MOLM except that of intestine weight with content. Perhaps, the insignificant result in the case of gizzard with content, empty gizzard, liver, kidney, heart, lungs, spleen, intestinal length, and intestine weight without content was due to raring the birds on deep litter system of production and thus recommended that further research be carried out on with their test diet using battery cage system of production.

CONCLUSIONAND RECOMMENDATIONS

The findings from this work shows that incorporating *Sacogglotis gabonensis* bark meal into the diet of pre starter, starter and finisher broiler chicken does not have any negative effect on their carcass and internal organs characteristics and up to 2.0% can therefore be use in poultry diet as as an additive.

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