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Growth performance and meat quality of broiler chickens fed diet containing "Sabara" (*Guiera senegalenses*) leaf meal

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Abstract
The study evaluated dietary inclusion (0, 7, 14, and 21%) levels of Guiera senegalensis leaf meals (GSL) on growth performance and meat quality of broiler chickens. A total of 240 broiler chicks (Chikun) were divided into four treatments with three replicates each (20 chicks per replicate) in a completely randomized design (CRD). The experiment lasted for 8 weeks. The results showed that feed intake, average daily feed intake, feed conversion ratio and mortality rates were significantly (P< 0.05) different among the four treatment groups. Other growth traits such as final weight, weight gain and average daily weight did not show significant differences across the treatments investigated. The compositional parameters of the fresh meat samples showed that per cent lipid, protein, ash and carbohydrate contents were significantly (P<0.05) different across the treatments. There were no significant differences with respect to per cent moisture and crude fibre among the treatments. However, chemical composition of meat floss (dambun nama) from broiler chickens fed GSL revealed that parameters such as moisture, lipid, crude fibre and carbohydrate differed (P < 0.05) significantly among the treatments. There were no significant differences in per cent crude protein and ash contents among the treatments. Sensory attributes of dambun nama from broiler chickens fed GSL showed that all the attributes (except juiciness) were not significantly similar. This study concludes that the incorporation of GSL in the diet of broiler chickens at 0, 7, 14 and 21% had no deleterious effects on carcass and organ characteristics, chemical composition of both fresh meat and processed meat floss. The meat floss was well - cherished by the sensory panelists and rated the product high for quality. However, GSL inclusions should be re-adjusted in further studies using broiler chickens for growth and carcass re-evaluation for meat quality.

Key words: *Guiera Senegalensis, broiler chickens, meat quality*

Introduction

Broiler meat is one of the nutritious meats consumed as component of human diets. It is an excellent source of high quality protein and also contains large amount of minerals and essential vitamins, as well as fats (Ojewola and Onwuka, 2001). However, it is a common practice that after slaughtering the animals the meat product is processed and consumed almost immediately without further storage (Steinhauster *et al.*, 1995). In Nigeria, meat processing is still in its technological infancy because the processing methods that have been in use for the past generations are yet to be standardized or modernized to cope with increasing consumer demand (Igene and Mohammed, 1983; Balarabe *et al*., 2016a).

The major constraint with traditional meat processing industries is lack of standardization requirements for the finished products (Bube, 2003). Therefore, processing method varies depending on the processor and the quality of the finished products (Farouk *et al*., 1992). Kalla *et al.* (2005) described the standardized processing method of meat floss (*dambun nama*) using fresh meat of good grade, cut into pieces of approximately 4 cm by 2.5 cm dimensions and washed with water, mixed

with spices and ingredients, boiled for about 90 minutes and pounded into shreds using a mortar and pestle. It is then shallow-fried using groundnut oil in a stainless steel pot to obtain a brownish colour of meat floss (*dambun nama*).

However, *Guiera senegalensis* (family: *Combretaceae*) commonly known as *sabara* in Hausa Language is a shrub of the Savannah region of West and Central Africa. This plant is being used widely in traditional medicine for the remedy of many ailments/diseases. The leaf extract is used against dysentery, diarrhoea, gastrointestinal pain and disorder, rheumatism and fever (Sule and Mohammed, 2006). This leaf can be used in meat preservation in order to reduce the prevalence of food borne diseases.

Previous research works using leaf extracts of *Guiera* was mostly on the suppression of microbial (fungal and bacterial) activities and growths in meat products have been severally reported. For instance, Balarabe *et al.* (2016c) and Balarabe *et al.* (2016d) dissolved leaf powder of *Guiera* at 3.0g/100ml of water in cooking both red and white meat (beef, mutton, chevon, camel and broiler chicken meat) to process five different types of meat floss for their effects on shelf-life and storage quality over a 5-week period. Furthermore, Salisu (2017) investigated the inclusion levels of 2.0. 3.0 and 4.0g/100 ml of water in cooking of beef to process meat floss and determined the shelf-life and storage quality up to 12 week period. Musa (2016) investigated the quality and shelf life of *dambun nama* processed using different types of white meat (turkey, duck, fish, guinea fowl and local chicken) for up to 5 week storage period.

However, the limitation of the earlier studies was in the manner of incorporation of these extracts (*Guiera*), which were only used during cooking processes of meat to process meat floss, as opposed to dietary inclusions of leaf meal in feeds of broiler chickens, and subsequent evaluation of the meat for processing into meat products, storage and preservation. Therefore, there is the need to investigate further the effects of dietary utilization of these leaf meals in broiler chicken production and meat processing into meat floss in order to determine its quality. Therefore, this study was designed to evaluate the effects of dietary inclusions of *Guiera senegalensis* leaf meals (GSL) on broiler performance and meat quality.

Materials and Methods

Study Area

The study was conducted at the Department of Animal Science, Faculty of Agriculture, Ahmadu Bello University, Zaria, Nigeria.

Sourcing and Processing of GSL

Leaves from healthy plants of *Guiera senegalensis* were sourced in Samaru and Sabon Gari markets of Zaria areas of Kaduna State, and shade-dried. The dried leaves were ground into powdered form to produce leaf meals of these respective plant materials.

Analysis for Anti-nutritional Factors

The leaf powder of *Sabara* (*Guiera senegalensis*) used in the study was analysed for anti-nutritional factors; tannin (1.60 mg/100g), saponin (1.38 mg/100g), phytate (3.10 mg/100g), alkaloid (11.58 mg/100g) and flavonoid (0.84 mg/100g) (AOAC, 2005).

Experimental Design and Management of Birds

Two hundred and fifty (240) chikun day old broiler chickens from Olam farm were used into four different dietary treatments comprising of a control (GSL1; 0) and different proportions of *Guiera senegalensis* (7.0, 14.0 and 21.0kg of diet to serve as treatments GSL2, GSL3 and GSL4, respectively) and replicated three (3) times with 20 chicks per replicate in a completely randomized design (CRD) (Tables 1 to 2). The trial also lasted for 8 weeks (0 – 4 weeks starter phase and 5 – 8 weeks finisher phase).

Table 1: Composition of broiler starter diet containing varying levels of *Guiera senegalensis* leaf meal (0 – 4 weeks)

Ingredients	GSL 1	GSL 2	GSL 3	GSL 4
Maize	50.00	46.00	43.00	41.00
FSBM	15.00	15.00	15.00	15.00
GSL	**0.00**	**7.00**	**14.00**	**21.00**
Maize offal	3.50	3.50	3.50	3.50
GNC	27.00	24.00	20.00	15.00
Bone Meal	3.00	3.00	3.00	3.00
Limestone	0.50	0.50	0.40	0.40
Methionine	0.25	0.25	0.25	0.25
Lysine	0.25	0.25	0.35	0.35
Common Salt	0.25	0.25	0.25	0.25
Vit. Premix	0.25	0.25	0.25	0.25
Total	**100.00**	**100.00**	**100.00**	**100.00**
Calculated Analysis				
Crude Protein (%)	23.11	23.32	23.28	23.13
ME (Kcal/kg)	2911	2901	2903	2900
Calcium (%)	1.34	1.34	1.31	1.31
Phosphorus (%)	0.63	0.63	0.62	0.62
Ether Extract (%)	6.45	6.55	6.63	6.71
Crude Fibre (%)	4.61	4.81	4.91	5.00
Lysine (%)	1.21	1.18	1.20	1.17
Methionine (%)	0.56	0.54	0.52	0.51
Cost ₦/kg	120.4	116.0	112.0	107.3

GSL= *Guiera senegalensis* Leaf Meal, GNC= Groundnut cake, FSBM= Full fat soya bean meal. *Bio-mix broiler starter premix per 2.5kg of diet: Vit A, 10,000 I.U; Vit D_3, 2,000 I.U; Vit E, 23,000mg; Vit K_3, 2000mg; Vit B1,(thiamine) 1,800; Vit B_2(riboflavin), 5,500mg; Niacin, 27,500; Panthonenic acid, 7,500; Vit B6(pyridoxine), 3000mg; Vit B_{12}, 15.00; Folic acid, 750.00mg; Biotin H_2, 60.00mg; Cholin Chloride, 300,000mg; Cobalt, 200mg; Copper,3000mg; Iodine, 3,000mg; Iron, 1,000mg; Manganese, 40,000.00mg; Selenium, 40,000mg; Zinc, 200mg; Antioxidant,1,250mg . M.E= Metabolisable energy

Feed and clean water was given *ad libitum* to the birds throughout the experimental period. Vaccinations against Newcastle and Gumboro diseases were done at appropriate time, as recommended by the Veterinary Teaching Hospital (VTH) of Ahmadu Bello University, Zaria. Other standard methods such as fumigation, sanitation and prophylactic medications were given to ensure good health of the birds.

Performance Traits Evaluation

The initial body weights of the birds were measured at the beginning of the experiment, while final body weights were recorded at the end of the experiment. Feed consumption and body weight of the birds were taken weekly. Body weight was then computed as the difference between the final body weight and the initial body weight. The feed conversion ratio was computed as the ratio between feed intake and body weight gain.

Carcass evaluation traits

At the end of the 8^{th} week of the experimental trial, three (3) birds of representative weights were randomly selected from each replicate making 12 birds per treatment. The birds were fasted overnight and provided with water, then weighed,

slaughtered, and eviscerated. Carcass indices such as live weight, carcass weight, dressing weight, dressing percentage, organs weight and weight of the prime cuts were taken. Prime cuts and organ weights were expressed as percentages of dressed weight and live weight, respectively.

Table 2: Composition of broiler finisher diet containing varying levels of *Guiera senegalensis* leaf meal (5- 8 weeks)

Ingredients	GSL 1	GSL 2	GSL 3	GSL 4
Maize	55.00	51.00	48.00	44.00
FSBM	10.00	10.00	10.00	10.00
GSL	**0.00**	**7.00**	**14.00**	**21.00**
Maize offal	8.50	8.50	8.50	8.50
GNC	22.00	19.00	15.00	12.00
Bone Meal	3.00	3.00	3.00	3.00
Limestone	0.40	0.40	0.40	0.40
Methionine	0.25	0.25	0.25	0.25
Lysine	0.35	0.35	0.35	0.35
Common Salt	0.25	0.25	0.25	0.25
Vit. Premix	0.25	0.25	0.25	0.25
Total	**100.00**	**100.00**	**100.00**	**100.00**
Calculated Analysis				
Crude Protein (%)	20.08	20.29	20.15	20.26
ME (Kcal/kg)	2972	2963	2963	2954
Calcium (%)	1.29	1.29	1.29	1.29
Phosphorus (%)	0.60	0.60	0.59	0.59
Ether Extract (%)	5.63	5.73	5.81	5.91
Crude Fibre (%)	4.63	4.83	4.93	5.13
Lysine (%)	1.13	1.10	1.05	1.01
Methionine (%)	0.53	0.51	0.48	0.48
Cost ₦/kg	116.6	112.2	107.5	103.1

GSL= *Guiera senegalensis* Leaf Meal, GNC= Groundnut cake, FSBM= Full fat soya bean meal. *Bio-mix broiler starter premix per 2.5kg of diet: Vit A, 10,000 I.U; Vit D_3, 2,000 I.U; Vit E, 23,000mg; Vit K_3, 2000mg; Vit B1,(thiamine) 1,800; Vit B_2(riboflavin), 5,500mg; Niacin, 27,500; Panthonenic acid, 7,500; Vit B6(pyridoxine),3000mg; Vit B_{12}, 15.00; Folic acid, 750.00mg; Biotin H_2, 60.00mg; Cholin Chloride, 300,000mg; Cobalt, 200mg; Copper,3000mg; Iodine, 3,000mg; Iron, 1,000mg; Manganese, 40,000.00mg; Selenium, 40,000mg; Zinc, 200mg; Antioxidant,1,250mg . M.E= Metabolisable energy

Proximate Analysis of Carcass

Fresh raw broiler meat samples from the various treatments of Experiment 1 (GSL1, GSL2, GSL3 and GSL4) were immediately taken to laboratory for analysis of proximate composition (dry matter, crude protein, crude fibre, lipid and ash) as per the procedures laid down by AOAC (2005).

Processing of *Dambun Nama* from Broiler Chickens Fed GSL

Carcass from broiler chicken meat from Experimental trial (GSL1, GSL2, GSL3 and GSL4) were processed into *dambun nama*. Fresh broiler meat was cut into pieces of approximately 4 cm by 2.5 cm dimensions and washed with water, mixed with spices (ginger,

pepper, onion, cloves, garlic, Maggi, thyme, salt, curry etc.), boiled for about 90 minutes and pounded into shreds using a mortar and pestle. This was then shallow-fried using groundnut oil in a stainless steel pot to obtain meat floss (*dambun nama)*, which is usually brownish in colour (Farouk, 1985; Kalla *et al*., 2005).

Proximate Analysis of *Dambun Nama*

Freshly processed meat floss from broiler chickens fed GSL (GSL1, GSL2, GSL3 and GSL4) leaf meals were immediately taken to laboratory for analysis of proximate composition (moisture, crude protein, crude fibre, lipid, ash and carbohdrate) as per the procedures laid down by AOAC (2005). .

Sensory evaluation of *dambun nama*

Meat floss processed from broiler chickens fed GSL (GSL1, GSL2, GSL3 and GSL4) were subjected to sensory evaluation for their acceptance. Forty (40) sensory judges (staff and postgraduate students only) of the Department of Animal Science, Faculty of Agriculture, Ahmadu Bello University, Zaria; familiar with quality attributes of meat products were constituted for evaluation, using the 5 - point Hedonic scale: 1 - like very much, 2 - like moderately, 3 - neither like nor dislike, 4 - dislike moderately and 5 - dislike very much (Bube, 2003). The sensory attributes to consider are tenderness, juiciness, texture, colour, aroma and acceptability.

Statistical Analysis

Data obtained from the experiments were subjected to the analysis of variance (ANOVA) using the general linear model procedure of Statistical Analysis System (SAS, 2008). Significant means were used to separate using Duncan's Multiple Range Test (DMRT) in the SAS version 9.0 Package.

Table 3: Growth performance of broiler chickens fed dietary inclusion levels of *Guiera senegalensis* leaf meals (0-8weeks)

	Treatments					
Parameters	**GSL1 (0%)**	**GSL2 (7%)**	**GSL3 (14%)**	**GSL4 (21%)**	**SEM**	**LOS**
Initial weight(g)	251.67	250.00	253.33	250.00	4.167	NS
Final weight(g)	2166.70	2207.00	2196.90	2216.70	29069.90	NS
Weight gain(g)	1915.00	1957.00	1943.50	1966.70	29019.96	NS
Feed intake(g)	5332.40^{a}	4698.20^{b}	4731.50^{b}	4536.70^{b}	47868.08	*
Average daily feed intake(g)	95.22^{a}	83.89^{b}	84.47^{b}	81.01^{b}	15.264	*
Average daily weight gain(g)	34.19	34.95	34.71	35.12	9.254	NS
Feed conversion ratio	3.19^{b}	2.73^{b}	2.77^{b}	2.63^{a}	0.088	*
Mortality (%)	18.33^{a}	5.00^{b}	5.00^{b}	0.00^{b}	14.58	*

a,b,c: Means having different superscripts across row are significantly different at P<0.05, GSL- *Guiera senegalensis* leaf meal, SEM- Standard Error Mean, NS- Not significant at P<0.05

Results and Discussion

The growth performance of broiler chickens fed diet containing graded levels of GSL is shown in Table 3. The result showed that growth parameters such as initial weight, final weight, weight gain, average daily weight gain and feed conversion ratio were not significantly different across the treatment groups (GSL1, GSL2, GSL3 and GSL4). Other growth traits (feed intake, average daily feed intake and mortality) were significantly (P<0.05) different among the treatment groups.

For instance, feed intake was significantly (P<0.05) higher in GSL1 (5332.40g) than in GSL2 (4698.20g), GSL3 (4731.50g) and GSL4 (4536.70g). Similarly, average daily feed intake was higher (P<0.05) in GSL1 (95.22g) than GSL2 (83.89g) and GSL3 (84.47g) and GSL4 (81.01g). The mortality rate was significantly (P<0.05) higher in the control (GSL1) (18.33%) than in other treatments; GSL2 (5.00%), GSL3 (5.00%) and GSL4 (0.00%), as shown in Table 3.

Furthermore, carcass traits (live weight and breast weight) were the only parameters that showed significant (P<0.05) differences among the treatments. For instance, the live weight were 1916.7, 1766.7, 1900.0 and 2100.0g for GSL1, GSL2, GSL3 and GSL4 (P<0.05), respectively. The breast weight also differed (P<0.05) significantly among the treatment groups; with GSL3 (26.59g) and GSL4 (27.46g) being heavier than GSL1 (22.76g) and GSL2 (21.41g). All the other carcass traits were not significantly different among the treatments, as depicted in Table 4.

Table 4: Carcass and Organ Characteristics of Broiler Chickens fed dietary levels of *Guiera senegalensis* Leaf meal

	Treatments				
Parameters	**GSL1 (0%)**	**GSL2 (7%)**	**GSL3 (14%)**	**GSL4 (21%)**	**SEM**
Live Weight(g)	1916.7^{ab}	1766.7^{b}	1900.0^{ab}	2100.0^{a}	26041.67*
Dressed Weight(g)	1750.00	1433.3	1541.7	1866.7	47500.00 NS
Dressing Percentage(%)	67.560	59.538	59.258	66.990	43.446 NS
Oragans Weight (expressed as percentages of live weight)					
Heart	0.475	0.433	0.493	0.511	0.004 NS
Gizzard	2.383	2.460	2.358	2.460	0.097 NS
Liver	2.325	1.991	1.880	1.965	0.254 NS
Abdominal Fat	2.358	1.528	2.057	2.205	0.810 NS
Prime Cuts Weight(expressed as percentages of dressed weight)					
Drumstick	13.959	14.856	14.317	13.937	0.287 NS
Breast	22.762^{ab}	21.413^{b}	26.590^{a}	27.464^{a}	5.910*
Thigh	16.592	17.059	16.427	18.882	8.037 NS
Back	17.272	17.427	17.468	16.970	0.757 NS

a,b,c: means having different superscripts across row are significantly different at P<0.05, GSL- *Guiera senegalensis* leaf meal, SEM- Standard Error Mean, NS- Not significant at p<0.05

Table 5: Chemical composition of fresh broiler chicken meat fed dietary inclusion levels of *Guiera senegalensis* leaf meals

Treatment	GSL1(0%)	GSL2(7%)	GSL3(14%)	GSL4(21%)	SEM
Dry Matter	24.92	24.49	25.28	25.06	2.328NS
Lipid	10.20^{c}	11.69^{b}	16.19^{a}	6.70^{d}	0.280*
Protein	47.91^{d}	59.52^{b}	56.85^{c}	64.05^{a}	0.674*
Fibre	2.90	3.25	2.95	3.25	0.079NS
Ash	2.96^{a}	2.81^{a}	2.14^{b}	2.90^{a}	0.032*
CHO	1.41^{b}	1.50^{a}	1.54^{a}	1.30^{b}	0.333*

a,b,c: Means across row having different superscript are significantly different at P< 0.05, NS= Not significant ,GSL= *Guiera senegalensis,* SEM= Standard error mean.

Table 5 depicts information on chemical composition of fresh broiler chicken fed dietary inclusion levels of GSL. The results showed that percentages of moisture and fibre contents were not significantly influenced by dietary feeding of GSL in broiler chicken diets. The results also showed that other chemical compositional parameters such as percentages of lipid, crude protein, ash and carbohydrate contents were significantly (P<0.05) affected by dietary inclusion of GSL in broiler chickens.

However, the per cent lipid was highest (P<0.05) in GSL3 (16.19%), followed by GSL2 (11.69%) and lowest in GSL4 (6.70%). The per cent crude protein was highest in GSL4 (64.05%) followed by GSL2 (59.52%) and lowest in GSL1 (47.91%); values differed (P<0.05) significantly. The per cent ash content was significantly (P<0.05) different among the treatments; values being 2.96, 2.81, 2.14 and 2.90% for GSL1, GSL2, GSL3 and GSL4, respectively. The results also revealed that the per cent carbohydrate contents in the broiler meat were 14.01, 1.50, 1.50 and 1.50% (P<0.05) for GSL1, GSL2, GSL3 and GSL4, respectively (Table 5).

Data on chemical composition of meat floss processed from broiler chicken fed dietary inclusion levels of GSL are shown in Table 6. The results showed that the per cent moisture, lipid, fibre and carbohydrate contents differed (P<0.05) significantly across the treatment groups. For example, the per cent moisture contents were 3.57, 3.61, 2.46 and 4.86% (P<0.05) for GSL1, GSL2, GSL3 and GSL4, respectively. The lipid contents were 49.25, 48.05, 43.15 and 44.15% (P<0.05) for GSL1, GSL2, GSL3 and GSL4, respectively. The per cent crude fibre and carbohydrate contents for GSL1, GSL2, GSL3 and GSL4 were 2.25 vs 4.85%, 2.90 vs 0.69%, 2.93 vs 0.68% and 2.14 vs 1.47%, respectively (Table 6).

Table 6: Chemical composition of processed broiler chicken meat (*Dambun nama*) fed dietary inclusion levels of *Guiera senegalensis* leaf meals

Treatments	GSL1 (0%)	GSL2 (7%)	GSL3 (14%)	GSL4 (21%)	SEM
Moisture	3.57^{b}	3.61^{b}	2.46^{b}	4.86^{a}	0.095*
Lipid	49.25^{a}	48.05^{b}	43.15^{d}	44.15^{c}	0.105*
Protein	44.44	44.82	51.54	46.88	9.467NS
Fibre	2.25^{b}	2.90^{a}	2.93^{a}	2.14^{b}	0.041**
Ash	2.90	2.84	2.19	2.65	0.161NS
CHO	4.85^{a}	0.69^{b}	0.68^{b}	1.47^{b}	0.244*

a,b,c: Means across row having different superscript are significantly different at P< 0.05, NS= Not significant, GSL= *Guiera senegalensis*, SEM= Standard error mean.

Data on sensory attributes of meat floss processed from broiler chickens fed dietary inclusion levels of GSL are shown in Table 7. The attributes investigated were colour, texture, aroma, tenderness, juiciness and acceptability. Juiciness was the only attribute that was significantly (P<0.05) different among the treatments. GSL2 (1.41) and GSL4 (1.56) were better (liked very much) (P<0.05) than GSL3 (2.04) and GSL1 (1.59) which were liked moderately. However, there were no significant differences with respect to colour, texture, aroma, tenderness and acceptability, as presented in Table 7.

Table 7: Sensory evaluation of meat floss (*dambun nama*) processed from broiler chicken meat fed dietary inclusion levels of *Guiera senegalensis* leaf meal

Sensory attributes	GSL1 (0%)	GSL2 (7%)	GSL3 (14%)	GSL4 (21%)	SEM	LOS
Colour	1.52	1.63	1.56	1.30	0.571	NS
Texture	1.85	1.63	1.89	1.89	0.610	NS
Aroma	1.63	1.67	1.89	1.93	0.681	NS
Tenderness	1.74	1.89	2.04	1.86	0.656	NS
Juiciness	1.59^{ab}	1.41^{b}	2.04^{a}	1.56^{b}	0.718	*
Acceptability	1.59	1.56	2.04	1.82	0.773	NS

a,b,c: Means across row having different superscript are significantly different at P< 0.05, NS= Not significant ,Like very much = 1, Like moderately = 2, neither like nor dislike = 3, Dislike moderately = 4, Dislike very much = 5.

However, growth parameters like initial weight, final weight, weight gain, average daily weight gain were not significantly different across the treatment groups of broiler chickens fed dietary inclusion levels of *Guiera senegalensis* leaf meals. Conversely, other growth parameters like feed intake, average daily feed intake, feed conversion ratio and mortality were significantly (P > 0.05) different among the treatments with GSL1 having the highest values. This might be attributed to the effect of anti- nutritional factors present in *Guiera senegalensis* leaf which is most likely to reduce feed intake and nutrient digestion or absorption.

Furthermore, carcass traits (live weight and breast weight) of birds fed dietary inclusion levels of *Guiera senegalensis* leaf meals were significantly (P > 0.05) different with GSL4 having the highest value on live weight (2100.0g) followed by GSL1 (1916.7g), GSL3 (1900.0g) and GSL2 (1766.7g) respectively. Other carcass traits such as dressed weight, dressing percentage, heart, gizzard, liver, abdominal fat, drumstick, thigh and back were not significantly affected among the treatment groups. This study shows that *Guiera senegalensis* leaf like other herbal drugs enhances digestion and encourages the growth of good bacteria and decreases unlikely microorganisms which will affect growth performance and gut micro flora of poultry.

There was no significant difference in the dry matter and fibre content of fresh broiler meat of birds fed inclusion levels of *Guiera senegalensis* leaf meals. Significant differences were observed in lipid, crude protein, ash and carbohydrate contents among the experimental groups. The per cent lipid was highest in GSL3 (16.19%) followed by GSL2 (11.69%), GSL1 (10.20%) and lower in GSL4 (6.70%).

However, the per cent values of all the compositional parameters of fresh broiler chicken meat fed dietary inclusion levels of *Guiera senegalensis* leaf meal observed in this study were similar and in contrast to other researches (Bube., 2003; Balarabe *et al*.; 2016b, Salisu., 2017), and this might be due to the presence of phytochemicals and bioactive components (trace metal ions, carotenoids, protein, polyphenols, vitamins etc) present in the plant leaf of *Guiera senegalensis* which interfere with biological utilization of protein, lipids and carbohydrates. Sravanti and Rao (2014) reported that these phytochemicals and bioactive components in the plant enhance long term health benefits. And also the difference could be due to variation of intra muscular fats (marbling) of the animals (Balarabe *et al*., 2016a).

The per cent moisture, lipid, fibre and carbohydrate contents were significantly (P > 0.05) different among the treatment groups with GSL4 having the highest moisture content value of 4.86 and GSL3 having the least value of 2.46. Per cent lipid was high in GSL1

(49.25) followed by GSL2 (48.05), GSL4 (44.15) and GSL3 (43.15). This was similar to the reports of Bube (2003), Balarabe *et al.* (2016b) and Salisu (2017). This showed that *Guiera senegalensis* leaf meals did not affect the quality of meat floss. The per cent ash content is lower than previous reports of Balarabe *et al.* (2016b) on ash content of meat floss processed using plant leaf meal and extract.

The mean panel score of colour, tenderness, texture, aroma and acceptability did not show any significant difference among the treatment groups, except for juiciness which showed significant ($P > 0.05$) difference across the treatment groups with GSL1 (1.59) and GSL4 (1.56) having the highest values, followed by GSL2 (1.41) and GSL3 (2.04) respectively. This result was in line with the reports of Balarabe *et al.* (2016a) who used *Guiera senegalensis* extract in processing meat floss.

Conclusions and Recommendations

This study concludes that the incorporation of GSL in the diet of broiler chickens at 0, 7, 14 and 21% had no deleterious effects on carcass and organ characteristics, chemical composition of both fresh meat and processed meat floss. The meat floss was well - cherished by the sensory panelists and rated the product high for quality. However, GSL inclusions should be re-adjusted using higher proportions of the plant leaf meal in further studies using broiler chickens for growth and carcass re-evaluation for meat quality.

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