CARCASS CHARACTERISTICS OF BROILER CHICKENS FED RAW AND DIFFERENTLY PROCESSED ROSELLE (*HIBISCUS SABDARIFFA*) SEEDMEAL

O. O. EGBEWANDE, H. IBRAHIM, A. B. MUSA AND H. A. ZAKARI
Department of Animal Production, Ibrahim BadamasiBabangida University, Lapai, Niger State
Correspondence: femi2015.ooe@gmail.com

ABSTRACT
Raw and differently processed roselle (*Hibiscus sabdariffa*) seed meal were fed as part replacement for groundnut caketo one hundred and fifty (150)Abor acre broiler chickens whose carcass characteristics were determined. The birds were randomly assigned to five dietary treatments with three replicates (ten chicks per replicate)each in a completely randomized design (CRD). In the feeding trial, raw roselle seed meal (R_aRSM), roasted roselle seed meal (R_oRSM), boiled roselle seed meal (BRSM) and soaked roselle seed meal (SRSM) were incorporated as part replacement for groundnut cake at 50% level of inclusion. Results obtained for cut-up parts showed no significant ($P>0.05$) differences exceptfor wings of the bird fed roasted roselle seed meal was significantly ($P<0.05$) different and higher than those fed control, raw, boiled and soaked roselle seed meal (10.87, 7.52, 9.85 and 9.46% respectively). Results from visceral organs showed no significant ($P>0.05$) different but for proventriculus which exhibited significant ($P<0.05$) differences among the treatment means. Birds fed roasted roselle seed meal (R_oRSM) had the highest value (0.80%) while those fed raw roselle seed meal (R_aRSM) gave the least (0.50%). This study however, revealed that using processed roselle (*Hibiscus sabdariffa*) seed meal as part replacement for groundnut cake did not pose any threat to the cut-up parts and the visceral organs of broiler chickens.
Keywords: carcass characteristics, processed roselle, broiler chickens.

INTRODUCTION

Roselle (*Hibiscus sabdariffa)* is an annual plant, erect, bushy, herbaceous sub-shrub that can grow up to 8 ft (2.4 m) tall, with smooth or nearly smooth, cylindrical, typically red stems(Amin*et al.*, 2008).Fresh or dried calyces of *H. sabdariffa* are used in the preparation of herbal drinks, hot and cold beverages, fermented drinks, wine, jam, jellied confectionaries, ice cream, chocolates, flavouring agents, puddings and cakes (Bako*et al.*, 2009, Bolade*et al.*, 2009, Ismail *et al.*, 2008, Okoro, 2007. In Africa, the seeds are roasted or ground into powder and used in meals, such as oily soups and sauces. In China and West Africa, the seeds are also used for their oil (Atta and Imaizumi, 2002). Roselle (*Hibiscus sabdariffa* L.) seed is a valuable food resource due to it is rich in protein content and micronutrients. It is also an excellent source of fibre (Omabuwajo*et al.* 2000). Roselle seeds contain 18.3 % of total dietary fibres (Amin *et al.*, 2008). According to Tosh and Yada (2010), the edible seeds from pulses are rich food source of dietary fibres that enhance various health benefits. Dietary fibre present in roselle seeds contribute to physiological and health benefits. Roselle seeds can be considered good ratio of soluble to insoluble fibre fraction (Amin *et al.*, 2008). It is on the above

MATERIALS AND METHODS

This experiment was carried out at the Teaching and Research Farm of Ibrahim BadamasiBabangida University, Lapai, Niger State, Nigeria. Lapai lies between latitude $9^0$31 and $9^0$45, east of equator (Usman, 2013).

Fish meal, blood meal, maize, bone meal, lime stone, salt, wheat offal, premix, lysine, methionine, groundnut cake were purchased from Animal Care retailer shop GidanMatasa, Okada road, Minna, Niger State. Roselle seed was obtained from Local market, in and around Lapai, and were divided into four (4) different portions: the first portion was processed by soaking in water for 24hours, the second portions; was boiled for 30minutes, the third portion was roasted and the fourth portion was left raw. One hundred and fifty day old broiler chicks of mixed sexes were used for the experiment. The pen was washed and disinfected two weeks to the arrival of the chicks with litter materials been spread on the floor, feed and

water served immediately the chicks arrived and the temperature of the brooding room was under control. The chicks were randomly assigned into five dietary treatments in a completely randomized design (CRD). Each treatment was replicated thrice with ten (10) chicks per replicate. Chargeable lamps were used as the source of the lighting and charcoal as source of heat.Anti-stress (Vitalyte) was given to the birds on arrival and also administered to birds after every weighing. Administration of vaccine used was oral (via drinking water). Birds were starved of water over-night and the vaccine was administered early in the morning.Experimental diets were compounded using Roselle seed to replace groundnut at 50% inclusion level as source of plant protein. Five diets were compounded which are:

Diet 1 (control) contained groundnut as major plant protein source. Diet 2 contained 50% groundnut cake and 50% raw roselle seed meal. Diet 3 contained 50% groundnut cakeand 50% roasted roselle seed meal. Diet 4 contained 50% groundnut cake and 50% boiled roselle seed meal. Diet 5 contained 50% groundnut cake and 50% soakedroselleseed meal.

At the end of the feeding trial (56 days), 6 birds per treatment (3 birds per replicate) were selected randomly and starved overnight (water served) and slaughtered for carcass evaluation according to (Jourdians, 1980). The cut up parts (breast region, back region, drum sticks, thighs, wings,) and visceral organs (liver, spleen, kidney, heart, gizzard, abdominal fat, and pancreas) were weighed.Data collected were subjected to analysis of variance (ANOVA), using Genstat (2011).

RESULTS AND DISCUSSION

Results obtained for cut-up parts (head, neck, drumstick, thigh, back, breast and shank) in Table 3 showed that there were no significant ($P>0.05$) difference. However, the value (12.47%) obtained for wings of the bird fed roasted roselle seed meal was significantly ($P<0.05$) different and higher than those fed from raw, boiled and soaked (7.52, 9.85 and 9.46%), but very close to that fed from control (10.87%). The least value (7.52%) was obtained from the wing of birds fed with raw roselle seed meal. This result is centrally to the finding of Stephen *et al* (2014), who reported significant difference in weight of the parameters. However, the result is also in line with the findings of Duwa *et al* (2012) who revealed that there were significant ($P>0.05$) differences in the weights of wings across the treatments.Results obtained for visceral organs (heart, gizzard, liver, spleen, kidney, abdominal fat, pancreas and intestine), in Table 4 were not significantly ($P>0.05$) different among the organs. However, there were significant ($P<0.05$) differences in the proventiculus of the birds across the treatment mean. The highest value (0.80%) was obtained from the proventiculus of the birds fed roasted seed meal, while the least value (0.50%) was from birds fed raw roselle seed meal. The results from this study was contrary to the findings of Stephen *et al.*, (2014) who reported significant ($P<0.05$) differences in the weights of gizzard and pancreas. Also, the result obtained from proventiculs is in agreement with the report of Owodola *et al* (2015) that there were significant ($P<0.05$) differences in the weights of proventiculus.

CONCLUSION

The result obtained from this study indicated that processed roselle seed meal could serve as a source of plant protein in broiler diets. It also showed that processed roselle seed meal can be used to replace 50% groundnut cake without any harmful effect on carcass characteristics of broiler chicken.

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Table 4: Visceral organs of broiler chicken fed different processed roselle seed

Parameter (%LW)	Control	R_aRSM	R_oRSM	R_oRSM	SRSM	SEM	LSD
Heart	0.57	0.51	0.73	0.65	0.59	0.738	1.701^{NS}
Gizzard	2.93	3.01	4.00	3.50	3.10	3.37	7.78^{NS}
Liver	2.79	2.52	3.76	3.20	2.90	3.28	7.56^{NS}
Spleen	0.13	0.13	0.18	0.52	0.12	0.356	0.820^{NS}
Proventiculus	0.58^{b}	0.50^{b}	0.80^{a}	0.71^{a}	0.27^{c}	0.655	1.510^{*}
Abdominal fat	1.11	1.24	1.73	1.42	1.16	3.76	8.67^{NS}
Pancreas	0.37	0.26	0.36	0.28	0.31	0.701	1.637^{NS}
Intestine	7.72	7.69	9.97	9.68	10.05	11.38	26.24^{NS}
Kidney	0.52	0.48	0.69	0.52	0.61	1.548	3.570^{NS}

SEM= standard error mean, LW= Live weight, * = significant, NS = Non-significant.

Table 3: Cut-up parts of broiler chicken fed processed roselle seed

Parameter (% LW)	Control	R_aRSM	R_oRSM	BRSM	SRSM	SEM	LSD
Head	2.51	2.47	2.47	2.84	3.11	1.811	4.176^{NS}
Neck	4.72	4.29	6.51	4.78	4.39	7.52	17.35^{NS}
Shank	3.60	3.75	4.54	3.89	4.01	3.56	8.22^{NS}
Drumstick	8.01	7.25	10.30	8.19	8.35	7.00	16.15^{NS}
Breast	10.02	8.88	10.92	10.55	10.85	18.74	43.21^{NS}
Back	10.61	11.08	12.21	14.12	12.93	12.62	29.14^{NS}
Thigh	9.17	9.26	11.74	10.90	10.57	14.56	33.58^{NS}
Wings	10.87^{b}	7.52^{d}	12.47^{a}	9.85^{bc}	9.47^{c}	13.58	31.32^{*}

SEM= standard error mean, LW= Live weight, * = significant, NS = Non-significant

Table 1: Gross composition of experimental starter diet

Ingredient	Control	R_aRSM	R_oRSM	BRSM	SRSM
Maize	53.41	53.41	53.41	53.41	53.41
Groundnut	26.70	13.35	13.35	13.35	13.35
Roselle seed meal	-	13.35	13.35	13.35	13.35
Wheat offal	10.00	10.00	10.00	10.00	10.00
Fish meal	3.00	3.00	3.00	3.00	3.00
Blood meal	3.00	3.00	3.00	3.00	3.00
Bone meal	2.40	2.40	2.40	2.40	2.40
Limestone	0.80	0.80	0.80	0.80	0.80
Salt	0.25	0.25	0.25	0.25	0.25
Vitamin premix	0.25	0.25	0.25	0.25	0.25
Lysine	0.10	0.10	0.10	0.10	0.10
Methionine	0.10	0.10	0.10	0.10	0.10
Total	100.00	100.00	100.00	100.00	100.00
Calculated:					
CP (%)	23.08	22.51	22.78	23.05	22.78
ME (Kcal/kg)	2863.66	2916.15	2901.43	2911.12	2901.06

R_aRSM = Raw roselle seed meal, R_oRSM = Roasted roselle seed meal, BRSM = Boiled roselle seed meal, SRSM = Soaked roselle seed meal

Table 2: Gross composition of experimental finisher diet

Ingredient	Control	R_aRSM	R_oRSM	BRSM	SRSM
Maize	56.32	56.32	56.32	56.32	56.32
Groundnut	24.78	12.39	12.39	12.39	12.39
Roselle seed meal	-	12.39	12.39	12.39	12.39
Wheat offal	10.00	10.00	10.00	10.00	10.00
Fish meal	3.00	3.00	3.00	3.00	3.00
Blood meal	2.00	2.00	2.00	2.00	2.00
Bone meal	2.40	2.40	2.40	2.40	2.40
Limestone	0.80	0.80	0.80	0.80	0.80
Salt	0.25	0.25	0.25	0.25	0.25
Vitamin premix	0.25	0.25	0.25	0.25	0.25
Lysine	0.10	0.10	0.10	0.10	0.10
Methionine	0.10	0.10	0.10	0.10	0.10
Total	100.00	100.00	100.00	100.00	100.00
Calculated:					
CP (%)	21.68	21.03	21.28	21.52	21.28
ME (Kcal/kg)	2879.95	2928.68	2915.01	2924.01	2914.67

R_aRSM = Raw roselle seed meal, R_oRSM = Roasted roselle seed meal, BRSM = Boiled roselle seed meal, SRSM = Soaked roselle seed meal