EFFECT OF REPLACING WHEAT OFFAL WITH RICE BRAN ON CARCASS CHARACTERISTIC AND COST BENEFIT OF BROILER CHICKENS

[1]Usman, Y., [2]Egbo, L.M., [2]Abdulkarim, M.,[2]Doma, U.D.
[1]Department of Animal Health Technology, Bauchi State College of Agriculture, Bauchi State
[2]Department of Animal Production, Abubakar Tafawa Balewa University, Bauchi, Nigeria

ABSTRACT
A trial was carried out to evaluate the effects of replacing wheat offal with rice bran on the growth performance and carcass characteristics of broiler chickens. The study was conducted at the experimental Unit Poultry Farm of Bauchi State College of Agriculture, Bauchi. A total of two hundred (200) day old broiler chicks were randomly allotted to five (5) dietary treatments containing 0%(T1), 25%(T2), 50%(T3), 75%(T4) and 100%(T5) level of inclusion of rice bran as a replacement to wheat offal. Each treatment was replicated three times with thirteen (13) birds per replicate in a Completely Randomized Design. Feed and water were supplied ad libitum and the experiment lasted for eight (8) weeks. The result show that carcass characteristics, significance difference(P<0.05) existed in live weight (1.59-1.91kg), pluck weight (1.35-1.73kg), eviscerated weight (1.13-1.38kg), carcass weight (0.94-1.28kg), intestinal length (166.67-217.17cm) and pancreas (0.16-0.67g) while dressing percentage and other gut characteristics does not differ. The feed cost in naira/kg body weight gain decreased with increased level of rice bran there by reduced the cost of production up to 20.06%, with the highest cost saving on (T5) 100% inclusion levels (₦52.21). From the experiment conducted, it is therefore concluded that dressing percentage and others gut characteristics were not influenced by the dietary levels of rice bran while Carcass weight, live weight, pluck weight, eviscerated weight, pancreas and intestinal weight were significantly (P<0.05) affected, feed cost in naira per kg body weight gain decreased with an increased levels of Rice bran.

Keywords: broiler chickens, rice bran, cost benefit, carcass

INTRODUCTION
There has been a steady increase in the cost of conventional feed ingredients such as maize, groundnut cake, soybean meal and fish meal in the past years and this has led to increase in the prices of animal protein sources (Adejinmi *et al*., 2007). Several workers have emphasized the need for utilizing alternative feed ingredients removed from human and industrial uses (Fanimo *et al*., 2007; and Nsa *et al*., 2007). There is, therefore, a dire need for the animal nutritionists to seek for alternatives to the inadequate and expensive conventional feedstuffs to forestall an impending serious food crisis. Some workers (Kwari *et al*., 2004; Okah, 2004) have stressed the need for utilization of alternative feed ingredients. To avert the problem of low animal protein deficiency, the production of animals with short generation interval such as poultry is needed. Among the different kinds of livestock that are produced in Nigeria, animal scientists generally agreed that developing the poultry industry is one of the fastest ways of bridging the protein deficiency. According to Ogundipe and Sanni (2002) and FAO (2006) reports poultry is considered to be a mean of livelihood and a way of achieving a certain level of economic independence of Nigeria. This study aimed at evaluating the effect replacing wheat offal with rice bran on Carcass Characteristic and cost benefit of Broiler Chickens.

Materials and Methods
The experiment was conducted at the Poultry Unit of Bauchi State College of Agriculture Bauchi Teaching and Research farm. Bauchi State occupies a total land area of 49,119 km² representing about 5.3% of Nigeria's total land mass and is located between latitudes 9° 3' and 12° 3' North and longitudes 8° 50' and 11° East (BSD, 2009).

The room was washed, disinfected and the cemented floor was covered with saw dust. A total of 200 day old chicks were used. The chicks were brooded for seven (7) days. After the brooding period, the chicks were randomly allotted to five experimental treatments, and replicated three times with thirteen (13) birds per replicate. Feed and water were supplied *ad-libitum*. The necessary vaccine such as Infectious bursal disease vaccine (IBDV) and Newcastle disease vaccine (NDV) was carried out at appropriate time.

Five (5) diets were formulated and designed as diets A, B, C, D and E. Diet A was the control (no rice bran). While diets B, C, D and E contain rice bran as replacement for wheat offal at 25, 50, 75 and 100% at level of inclusion respectively. The various diets were compounded manually. The formulated diet contains 23 and 20% crude protein at starter and finisher respectively. The percentage

composition and calculated analysis of experimental diets are shown in Tables 1 and 2. The experimental design adopted was a completely randomized design (CRD). The four diets formed the treatments and each treatment was replicated three times and had 13 birds per replicate.

The carcass evaluation was done at Poultry Farm of the Department of Animal Health and Production, College of Agriculture Bauchi, Bauchi State. At the end of the finisher phase (8 weeks), two chickens were randomly taken from each treatment, fasted for 12 hours and weighed. They were slaughtered by making a clean cut through the carotid arteries and jugular veins in the neck with a sharp knife and allowed to breed completely. They were defeathered, eviscerated, and cut into legs, head and the visceral organs (liver, intestine, lung, kidney, pancreases, and gizzard).

Results and Discussion

Results of carcass characteristics are shown in Table 3. The results show significant differences ($P > 0.05$) between treatments for the live weight, carcass weight, pluck weight, eviscerated weight, intestinal length and pancreases weight, this could be due the different levels of inclusion of rice brand. This report is not in harmony with the observation of Abdulraheem *et al*. (2006) who observed no significant differences between treatments when rice bran was used to replace maize in broiler chicken diets. However, dressing percentage and others gut characteristics did not differ significantly ($P < 0.05$) between treatments, this could also be as a result of quality ingredients used and utilization of diets across all the treatments. The results obtained in this study agreed with those of Amaefule *et al*. (2006) who observed no significant differences in carcass and organ characteristics of broiler chickens fed RMW-based diets**.**

The highest feed cost (98.46₦/kg) was observed in diet 1 control (wheat offal based diet) while the lowest value (73.1₦/kg) was recorded in diet 5 (rice offal based diet), total feed cost was also higher (364.30₦/kg) in diet 1 control (wheat offal based diet) while the lowest value (255.85₦/kg) were recorded in diet 5 (Rice offal based diet). This could be attributed to difference in prices of these Agro industrial by-products as of the time of experiment. Higher feed cost ₦ per kg gain (260.22₦/kg) was observed in diet 1 (Wheat offal) based diet compared to diet 5 (Rice bran) based diet which recorded the lowest value (208.01₦/kg. These values were higher than those (82.62-113.02₦/kg and 157.18-179.75₦/kg) reported by (Grace *etal*.,2007; Ezieshi *et al.* 2011) on broiler chickens fed diets containing maize replaced with wheat offal and varying levels of palm kernel cake with maize offal respectively. However, the total feed cost ₦/kg (73.10-98.46 ₦) obtained in this study were at variance to (628.04 -771.24₦/kg) those reported by (Odeh, *et al*., 2016; Nnenna, *et al.,* 2006) when broiler chickens fed graded levels of rice milling waste and maize offal based diets supplemented with Roxazyme G Enzyme.

Conclusion and Recommendation

Dressing percentage and others gut characteristics were not influenced by the dietary levels of rice bran while Carcass weight, live weight, pluck weight, eviscerated weight, pancreases and intestinal weight were significantly ($P<0.05$) affected. The use of rice bran in poultry nutrition particularly broiler chickens should be encouraged where the feed ingredient is available to help reduce feed cost which accounts for 70- 80% of the cost of production.

Table 1: Composition of experimental diets at starter phase

Ingredients	**Diet 1 (0%)**	**Diet 2 (25%)**	**Diet 3 (50%)**	**Diet 4 (75%)**	**Diet 5 (100%)**
Yellow sorghum	52.46	52.46	52.46	52.46	52.46
Soya bean	18.14	18.14	18.14	18.14	18.14
GNC	10.00	10.00	10.00	10.00	10.00
Fish meal	5.00	5.00	5.00	5.00	5.00
Wheat offal	10.00	7.50	5.00	2.50	0
Rice bran	0	2.50	5.00	7.50	10.00
Bone meal	2.00	2.00	2.00	2.00	2.00
Limestone	1.50	1.50	1.50	1.50	1.50
Salt	0.25	0.25	0.25	0.25	0.25
Premix	0.25	0.25	0.25	0.25	0.25
Lysine	0.20	0.20	0.20	0.20	0.20
Methionine	0.20	0.20	0.20	0.20	0.20
Total	**100**	**100**	**100**	**100**	**100**
Calculated Analysis					
Crude protein (%)	23.00	22.93	22.85	22.78	22.70
Metabolizable energy (kcal/kg)	2780.70	2767.90	2753.20	2725.35	2789.70
Crude fibre(%)	4.78	4.78	4.45	4.97	4.96
Ether extract(%)	3.83	4.07	4.29	4.51	4.73
Ash (%)	3.89	3.98	4.07	4.16	3.89

Table 1: Composition of experimental diets at finisher phase

Ingredients	**Diet 1 (0%)**	**Diet 2 (25%)**	**Diet 3 (50%)**	**Diet 4 (75%)**	**Diet 5 (100%)**
Yellow sorghum	55.40	55.40	55.40	55.40	55.40
Soya bean meal	13.20	13.20	13.20	13.20	13.20
Groundnut cake	10.00	10.00	10.00	10.00	10.00
Fish meal	2.00	2.00	2.00	2.00	2.00
Wheat offal	15.00	11.25	7.50	3.75	0
Rice bran	0	3.75	7.50	11.25	15.00
Bone meal	2.00	2.00	2.00	2.00	2.00
Limestone	1.50	1.50	1.50	1.50	1.50
Salt	0.25	0.25	0.25	0.25	0.25
Premix	0.25	0.25	0.25	0.25	0.25
Lysine	0.20	0.20	0.20	0.20	0.20
Methionine	0.20	0.20	0.20	0.20	0.20
Total	100	100	100	100	100
Calculated Analysis					
Crude protein (%)	20.00	19.89	19.78	19.67	19.55
Metabolizable energy (kcal/kg)	2736.10	2747.00	2765.00	2762.00	2736.10
Crude fibre(%)	4.20	3.52	4.84	4.52	4.20
Ether extract(%)	33.65	3.99	4.33	4.65	3.63
Ash (%)	3.48	3.42	3.75	3.89	4.02

Table 6: Carcass yield and gut characteristics (% body weight) of broiler chicks fed varying levels of rice bran

Parameters	Diet 1 (0%)	Diet 2 (25%)	Diet 3 (50%)	Diet 4 (75%)	Diet 5 (100%)	SEM
Live weight (kg)	1.91[a]	1.79[b]	1.59[c]	1.45[d]	1.57[c]	0.13*
Plucked weight (kg)	1.73[a]	1.63[b]	1.49[c]	1.35[c]	1.45[d]	0.11*
Eviscerated weight (kg)	1.38[a]	1.25[b]	1.25[b]	1.04[d]	1.13[c]	0.11*
Carcass weight (kg)	1.28[a]	1.14[b]	1.05[c]	0.94[e]	0.98[d]	0.09*
Dressing percentage (%)	67.19	63.67	66.09	63.72	63.12	5.58[NS]
Gizzard (%)	1.79	1.62	1.98	1.81	1.82	0.24 [NS]
Liver (%)	2.14	2.39	2.72	2.37	2.2	0.26 [NS]
Spleen (%)	0.11	0.12	0.12	0.06	0.10	0.04 [NS]
Kidney (%)	0.72	0.72	0.41	0.45	056	0.13 [NS]
Abdominal fat (%)	1.09	1.43	1.28	1.34	1.62	0.33 [NS]
Intestinal length (cm)	204.17[b]	217.17[a]	171.50[d]	166.67[e]	186.67[c]	13.19*
Intestinal weight (%)	3.78	3.93	4.00	3.87	3.74	0.48 [NS]
Ceacal weight (%)	0.93	1.10	1.02	1.00	1.00	0.11 [NS]
Head (%)	2.85	2.80	3.11	2.67	3.11	0.26 [NS]
Legs (%)	3.71	3.89	4.40	3.92	4.08	0.37 [NS]
Pancreas (%)	0.23[b]	0.27[a]	0.16[c]	0.12d	0.16[c]	0.05*
Lungs (%)	0.70	0.68	0.59	0.50	0.55	0.11 [NS]
Heart(%)	0.48	0.44	0.51	0.32	0.40	0.07 [NS]

NS= Not significant, SEM= Standard error of mean

Table 7: Economic analysis of broiler chicks fed varying levels of rice bran

Parameters	Diet 1 (0%)	Diet 2 (25%)	Diet 3 (50%)	Diet 4 (75%)	Diet 5 (100%)
Total feed intake (kg)	3.70	3.50	3.3 8	3.4	3.50
Feed cost (₦/kg)	98.46	95.89	82.21	70.37	73.10
Total feed cost (₦)	364.30	335.62	277.87	270.37	255.85
Total weight gain (kg)	1.40	1.48	1.28	1.24	1.230
Feed cost/weight gain (₦/kg/gain)	260.22	226.77	217.09	218.04	208.01
Cost saving	-	33.45	43.13	42.18	52.21

References

Abdulraheem, A.O., Abubakar, A. and Yahaya, U.K. (2006). Influence of rice bran on growth performance of broiler chickens *FCET JOVATEB.*vol.**1** (1):87-92

Adejinmi, O.O., Hamazat, R.A. and Fapohunda, J.B. (200)7. Performance and nutrient digestibility of rabbits. *Nigerian Journal for Animal Production,***34**(1):63-68.

Amaefule, K. U., Iheukwumere, F. C, Lawal, A. S. and EzeKwonna, A. A. (2006). Effect of treated rice milling waste on performance, nutrient retention, carcass and organ characteristics of finisher broiler. Nig. *Journal. Animal Production.* **5**:51-55.

Bauchi state agricultural development project. (BSADP). (1994). Annual report for the National fadama development project. Bauchi PME Unit.

Ezieshi, E.V., Obazele, O.M. and Olomu, J.M. (2011). Performance and energy metabolism by broiler chickens fed maize and millet offals at different dietary levels. *Journal of Agriculture and Social Research* (JASR).**1**(11):14-21.

Fanimo, A.O., Adebayo, A.J., Oduguwa, O.O. and Biobaku, W.O. (2007). Feeding value of cashew testa for broiler chickens. *Nigerian Journal of Animal Production,* **34**(1): 83-93

FAO, (2006). Food and Agriculture Organization of the United Nations. Village chicken production system in Rural African House, Food Security (edns). Agricultural Department, FAO corporate Document Repository. Pp: 9-11.

Grace, I.C., Samuel, O. and Idion, C.I. (2007). Effect of replacing maize with wheat offal in broiler finisher diets on Performance and feed cost. *Journal of Central European Agriculture.* **8**:1, 33-38.

Kwari, I.D., Igwebuike, J.U., Bello, N., Rabo, S.T. and Birma, M. (2004). Replacement of groundnut cake with sorrel (Hibiscus sabdariffa) seed meal in broiler chicken finisher diets. Proceedings of the 9th Annual Conference of Animal Science Association of Nigeria (ASAN) 13th-16th Sept., 2004, Abakaliki, Ebonyi state, Nigeria. Pp: 5-7.

Nnenna., O.P., Emaka, N.P. and Okpoko, C.L. (2006). Performance of broiler chicks (Gallus domesticus) fed maize offal-based diets supplemented with Roxazyme G Enzyme. *International Journal of Poultry Science*.**5**(7): 607-610

Nsa, E.E., Okereke, C.O. and Okon, B. 2007. Effects of supplementary green feedstuffs on growth performance, internal organs development and abdominal fat deposition in finisher broiler chickens. Proceedings of the 32nd Annual Conference of Nigerian Society for Animal Production (NSAP), 18th-21st March, 2007. University of Calabar, Cross River State, Nigeria. Pp: 230-233

Odeh, M.O. Igwebuike, J.U. Ubosi, C.O. Akwukwaegbu, S.O. (2016). Performance, Carcass Characteristics and Cost Benefit Analysis of Broiler Chickens Fed Graded Levels of Rice Milling Waste. *Journal of Biology, Agriculture and Healthcare.* **6**(19): 16-20

Ogundipe, S.O. and Sanni, S.A. (2002). Economic of poultry production in Nigeria. A Training Workshop Manual. National Animal Production Research Institute, ABU, Zaria. Pp: 27-45

Okah, U. (2004). Effect of dietary replacement of maize with maize processing waste on the performance of broiler chicken starter. Proceedings of the 29th Annual Conference of Nigeria Society for Animal production (NSAP), March, 21st-25th 2004, Usman Dan Fodio University, Sokoto, Nigeria. Pp: 220-224.