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PERFORMANCE OF BROILER CHICKENS FED GRADED LEVEL OF SUN-DRIED CASSAVA ROOT MEAL (SDCRM) BASED DIETS AT STARTER PHASE

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ABSTRACT

A four weeks experiment was conducted to determine the performance of broiler chickens fed graded level of sun-dried cassava root meal (SDCRM) to replace maize. Five diets were formulated in which maize was replaced with SDCRM at 0, 20, 30, 40 and 50% levels designated as diet 1,2,3,4 and 5, respectively on a deep litter system. Two hundred and forty chicks were weighed after brooding for seven days and randomly allotted to the five treatments with three replicated in a completely randomized design. All routine management practices were observed and the experiment lasted for four weeks. Parameters measured were: daily feed intake, daily weight gain, feed conversion ratio, feed efficiency and mortality. Data were analyzed using analysis of variances. *The performance of the chick in starter phase shows that DFI, DWG, FCR and FE were all similar except for daily weight gain. Significant reductions were observed in the daily weight gain of chicks fed SDCRM.*

Key words: Sun-dried, Cassava root meal, broiler chicks, daily feed intake and weight gain.

INTRODUCTION

Animal nutrition has been a key factor in solving the problems of supplying nutrients to animals at economic level and to provide balance nutrients to animals to reduce the cost of production as reported Aduku (2012). Reddy (2012) also reported nutrition as a major determinant of profit in the poultry industry as feed accounts for 70-80% of the cost of production. Maize which is the major source of energy in poultry feeds which constitutes about 60% in poultry diets is affected on a daily basis by rapid increased in human population, mass migration from rural to urban areas which contributed to low production of maize thereby build up competition between man and livestock for maize that resulted in high cost of feeds and consequently, high prices of poultry products leading to very low levels protein intake in most developing countries like Nigeria (Taiwo *et al*., 2005). Cassava products had been in use for a long time as an energy source in place of cereals grains for livestock (Eruvbetine *et al.,* 2003). Ospina and Wheatly (2005) reported that many feeding experiments have shown that cassava provides a good quality carbohydrate which may be substituted for maize or barley as rations for swine and poultry. Cassava leaf and peel meals at 20% has been a partial replacement for soya bean meal and maize which may go a long way in reducing the cost of protein and energy source and on the long run the sustainability of poultry production (Abu *et al.,* 2015). Nsa *et al.* (2019) reported significant depression in weight gain, feed intake and feed Conversion ratio values of chickens fed above 25% cassava root meal and cost of feed also decreased ($P<0.05$) significantly. Several authors have reported the inclusion of cassava root meal in poultry diets (Garcia and Dale, 1999; Adeyemi *et al.,* 2008; Anaeto and Adeighibe, 2011).

Therefore, replacing expensive conventional feed ingredients (maize) with cheap and available substitutes (sundried cassava root meal) is a good strategy at reducing feed cost and to encourage production of birds at all levels.

MATERIALS AND METHODS

Fresh sweet cassava roots (Manihot esculanta) purchased from a local farmer within Tafawa Balewa. The cassava root was peeled, cut into small pieces, sun-dried for 168 hours on a concrete platform. Thereafter, the sun-dried cassava roots were milled using hammer mill and sieved using 5 mm mesh for inclusion into the formulation. The feed was formulated and mixing was done at ATBU Bauchi feed mill. The experiment comprises of five diets: T1, T2, T3, T4, and T5. Sun-dried cassava root meal replaced maize at 0, 20, 30, 40 and 50% respectively at the starter phase. Presented in Table 1 is ingredients and nutrient composition of sun-dried cassava root meal.

A total of two hundred and forty (240) day old chicks (Arbor acres) were obtained from "Tuns Farms (Nig) Limited, Osogbo, km 9 Ikirun Road,Osogbo" through their Jos branch distributor. The chicks were brooded with commercial feed (vital feed) for one week before the commencement of the experiment. The chicks were randomly allotted to five treatments with 16 birds replicated three times in a randomized completely design. All vaccination schedules and management procedures were followed. Feed and water were provided ad-libitum and the experiment lasted for 28 days.

Data on feed intake and live weight were measured weekly and later used in calculating, weight gain, feed conversion ratio. All data were subjected to analysis of variance (ANOVA). The significant difference between treatments means were separated using Duncan's Multiple Range test of SPSS (2012).

Table 1: Ingredient and nutrient composition (%) of sun-dried cassava root meal at starter phase

Ingredients	Diets				
	T1 (0%)	T2 (20%)	T3 (30%)	T4 (40%)	T5 (50%)
Maize	43.73	36.58	32.01	27.44	22.86
Sun-dried cassava meal	0.00	9.15	13.72	18.29	22.87
Full fat soy bean	37.07	37.07	37.07	37.07	37.07
Fish meal	4.00	4.00	4.50	5.50	7.00
Wheat offal	12.00	10.00	9.50	8.50	7.00
Bone meal	2.50	2.50	2.50	2.50	2.50
Premix	0.25	0.25	0.25	0.25	0.25
Salt	0.25	0.25	0.25	0.25	0.25
Methionine	0.10	0.10	0.10	0.10	0.10
Lysine	0.10	0.10	0.10	0.10	0.10
Total	**100**	**100**	**100**	**100**	**100**
Calculated nutrients					
CP	23.60	22.90	22.90	23.14	23.63
ME kcal /kg	3063	3016	3013	3018	3031
CF (%)	4.38	4.90	5.21	5.48	5.71
EE	9.10	8.71	8.55	8.41	8.26
Ash	3.86	4.12	4.29	3.68	4.56
Ca	1.29	1.31	1.35	1.42	1.52
P	0.80	0.79	0.80	0.82	0.86

Biomix Vitamins and trace minerals premix each containing the following per 2.5kg: Vitamin A 10,000,000.00 i.u., Vitamin D_3 2,000,000.00 i.u, Vitamin E 23,000,000 mg, Vitamin K 2,000.00mg, Vitamin B_1, 1,800.00mg, Vitamin B_2 5,000.00 mg, Niacin 27,500.00mg, Pantothenic Acid 7,500.00mg Vitamin B6 3,000.00mg, Vitamin B_{12} 15.00mg, Folic Acid 750.00mg, Biotin H_2 60,000mg, Chlorine Chloride 300,000.00mg, Cobalt 200.00mg, Copper 3,000.00mg, Iodine

1,000.00mg, Iron 20,000.00 mg, Manganese 40,000.00mg, Selenium 200.00 mg, Zinc 30,000.00mg, Antioxidant 1,250.00mg.

Table 2: Performance of Broiler chickens fed graded levels of sun-dried cassava root meal based diets at starter phase (2 – 5 weeks)

	Diets					
Parameters	**1 (0%)**	**2 (20%)**	**3 (30%)**	**4 (40%)**	**5 (50%)**	**SEM**
DFI (g)	77.61	77.21	68.87	69.24	67.77	1.46^{NS}
DWG (g)	44.79^{a}	40.18^{b}	40.33^{b}	37.49^{c}	38.19^{bc}	0.29**
FCR	1.83	2.03	1.82	1.77	1.83	0.05^{NS}
FE	0.54	0.50	0.57	0.53	0.67	0.0^{NS}
Mortality	0	0	0	0	-	

^{abc} Means bearing different superscript within same row differ significantly (** = P<0.01)
NS= Not Significant, DFI= Daily feed intake, DWG= Daily weight gain, FCR= Feed Conversion ratio, FE= Feed Efficiency, SEM= Standard Error of Means

RESULT AND DISCUSSION

The effect of broiler chicken fed graded level of sun-dried cassava root meal is as presented in Table 2. The performance of broiler chicks fed graded levels of sun-dried cassava root meal significantly affected only daily weight gain across treatments and no significant differences were seen for daily feed intake, feed conversion ratio, feed efficiency and mortality.

The daily feed intake ranged from 67.77 to 77.61g per broilers chicks. However, all the daily feed intake (2 – 5 weeks) observed were similar across the dietary treatments. This agrees with the report of Hector (2006) and Tion and Adeka (2000) that fed broilers chicks with graded levels of cassava root meal based diets. Higher replacement values of sun-dried cassava root meal produced the least daily feed intake. The non significant difference is contrary to the finding of Ukachukwu, (2005) who reported a significant difference in daily feed intake of birds fed cassava root meal at 0, 20, 40, 60, 80 and 100%. Also, Hassan *et al.* (2012) reported significant reduction in feed intake of birds fed beyond 25% sun-dried cassava root meal.

Significant (P<0.05) reduction was observed for daily weight gain as replacement percentage of sun-dried cassava root meal increased from 20 – 50%. The daily weight gain (2 – 5 weeks) was observed to be significantly different (P<0.05) higher body weight gain of 44.79g/day than the other treatment diets while the lowest gain of 37.49g/day was obtained in birds fed diet 4 which was also similar to the weight gain of broilers on diet 5. The trend tends to decrease due to the increasing levels of SDCRM. This agrees with the findings of Hassan *et al.* (2012) and Ogbamgba and George (2015) that observed reduction in weight gain of broiler starter fed graded levels of cassava root meal beyond 25%. Reduction in weight gain could be as a result of Hydrogen cyanide (HCN) and higher fiber contents of diets. The feed conversion ratio and protein efficiency for broiler chicks fed 20 – 50% sun-dried cassava root meal was statistically similar to broiler chicks fed maize based diet. Absence of mortality in this study agrees the findings of Akinfala *et al.,* (2002) that cassava products do not cause any lethal loss to broilers at the starter phase.

CONCLUSION

Sun-dried cassava root meal (SDCRM) can be included at 50% level in the diet of broiler chickens at the starter phase without any negative effect on the growth and performance of the birds. By the result, it can be recommended that sun-dried cassava root meal can successfully be used as a substitute for the conventional energy food stuffs like maize in broiler rations at up to 50% level, provided that the high cassava based rations are duly balances for all nutrients, properly supplemented fish meal to correct nutritional problems associated with the meal.

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