International Journal of Science and Research (IJSR)
ISSN (Online): 2319-7064
Index Copernicus Value (2013): 6.14 | Impact Factor (2013): 4.438

An Assessment of the Effect of Feeding Graded Levels of Cassava Peel Meal Supplemented with Enzymes on Finisher Broiler Performance

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Abstract: ***A twenty eight days feeding trial was conducted to evaluate the effect of feeding graded levels of cassava peel meal supplemented with enzyme (natuzyme^R) on broiler performance. One hundred and sixty day old Sayeed chicks were randomly allocated to four dietary treatment (T_1 0%, T_2 25%,T_3 50,T_4 75% respectively) group so that each treatment has a total of forty (40) birds. This was replicated 4 times with ten (10) birds per replicate in a completely randomized design. The starter phase showed no significant (P>0.05) difference final weight gain and feed intake. However the finisher phase showed significant (P<0.05) differences in final weight gain, feed conversion ratio and feed intake. The study thus showed that sundried cassava peel meal can successfully be included at fifty (50) percent in place of maize. It is however necessary that such diet should be fortified with protein, sulphur, phosphorus as well as vitamin.***

Keyword: cassava peel meal, enzyme, starter phase, finisher phase, performance

1. Introduction

Maize is the most common cereal grain used as carbohydrate source in poultry production. However the use has been limited because of its competition for use by man, the beverage industries and other livestock production (Iji 2010). Continuous use of maize will result in perpetual increase in livestock and as well as on livestock product. Unconventional feed material like cassava peel meal has since been discovered a replacement for maize in poultry ratio (Tewe *et al*, 1999; Salami and Odusi, 2003; Agiang *et al*, 2004). Although cassava peel was observed to contain toxic substance such as phytates and large amount of cyanogenic glycosides. It should thus be processed to reduce cyanogenic and phytate content (Oboh, 2006; salami *et al*, 2003; Tewe, 1992; Adegbola *et a*l; 1985). Different processing methods have been adopted as way of reducing cyanogenic glycoside, such as sun drying, soaking and sun drying. The cassava peel meal has been used with success in cattle, sheep, goat, as well as in pig production. This purpose of the study to investigate the growth response of finisher broilers fed sundried cassava peel meal supplemented with enzyme.

2. Material and Method

The study was carried out at the Teaching and Research Farm, Poultry Unit of the Department of Animal/Fisheries Science and Management. Faculty of Agriculture and Natural Resource Management. Enugu State University of Science and Technology.

Experimental Diets and Treatment

Four (4) experimental diets were formulated according to treatment for both the starter and finisher broilers. Treatment (T_1) has 0% inclusion of cassava peel meal while treatment (T_2), (T_3) and (T_4) contain graded levels of cassava peel meal plus enzymes (Natuzyme^R) (25%, 50% and 75%). Tables: 1 and 2 shows the composition of the experimental diet.

Table 1: Composition starter diet (0-4 weeks)

Ingredient	T_1 (Control)	T_2 (25%)	T_3 (50%)	T_4 (75%)
SCPM	0.00	11.50	23.00	34.50
Maize	46.00	34.50	23.00	11.50
FFSB	21.00	21.000	21.00	21.00
Groundnut cake	14.9	14.9	14.9	14.9
Fish meal	4.00	4.00	4.00	4.00
Wheat offal	10.00	10.00	10.00	10.00
Bone meal	2.00	2.00	2.00	2.00
Limestone	2.00	2.00	2.00	2.00
Premix	0.25	0.25	0.25	0.25
Lysine	0.15	0.15	0.15	0.15
Methionine	0.25	0.25	0.25	0.25
Enzyme	0.01	0.01	0.01	0.01
Salt	0.25	0.25	0.25	0.25
TOTAL	**100**	**100**	**100**	**100**

Table 2: Composition of finisher diet (5-8 weeks)

Ingredient	T_1 (Control)	T_2 (25%)	T_3 (50%)	T_4 (75%)
SCPM	0.00	13.00	26.00	39.00
Maize	52.00	39.00	26.00	13.00
FFSB	16.00	16.00	16.00	16.00
G/nutcake	10.00	10.00	10.00	10.00
Fish meal	3.00	3.00	3.00	3.00
Wheat offal	13.49	13.49	13.49	13.49
Bone meal	2.00	2.00	2.00	2.00
Limestone	2.50	2.50	2.50	2.50
Salt	0.25	0.25	0.25	0.25
Premix	0.25	0.25	0.25	0.25
Lysine	0.15	0.15	0.15	0.15
Methionine	0.25	0.25	0.25	0.25
Enzyme	0.01	0.01	0.01	0.01
Total	**100**	**100**	**100**	**100**

Experimental birds

One hundred and sixty sayeed day-old chicks were randomly allocated to four experimental diets in a completely Randomized Designed, with four (4) replicates containing (10), birds. Each treatment contains forty (40) birds. Proper brooding as well as vaccination schedule was adopted during brooding.

3. Experimental Material

Fresh cassava peel meal was collected from garri processing plant in Agbani, Nkanu West Local Government Area of Enugu State. The fresh cassava peel meal were chopped, washed, soaked for a day and dried in the sun The peel were turned regularly to prevent uneven drying and possible decay. When the cassava peel becomes grispy by sun drying, it was milled using a hammer mill to produced the cassava peel meal. Enzymes Natuzyme^R were included in the diet at the rate of 0.01 for T_2, T_3 and T_4.

Chemical Analysis

The proximate analysis of sun dried cassava peel meal was carried out using the procedure described by A.O.A.C (2000).

Statistical Analysis

The data collected were subjected to analysis of variance (Steel and Torrie, 1980). Where significant treatment effect were observed from the analysis of variance, means were compared using Duncan's Multiple range Test as described by Obi (1990).

4. Result and Discussion

The nutrient composition of the experimental diets for starter phase and finisher phase is shown in Tables: 1 and 2, while the chemical composition of sun dried cassava peel meal is shown in Table: 3. The response of broiler birds to cassava peel meal supplemented with enzyme is shown in Tables: 4 and 5.

Table 3: Proximate composition of SCPM

Nutrient	% composition
Dry matter	87.23
Crude protein	5.83
Crude fibre	17.93
Ether Extract	1.82
Nitrogen free extract	72.01
HCL (mg/Kg)	52.84
Gross energy (kca/g)	3.2
Ash	5.28

Table 4: Starter phase (0-4 weeks)

Parameters	T_1	T_2	T_3	T_4
Average weight gain	864.83^a	859.21^a	862.14^a	791.16^a
Initial weight	75.08	74.92	75.00	74.73
Average daily weight gain	28.20	28.01	28.11	25.57
Average daily feed intake	49.27	50.18	50.00	52.64
Feed conversion ratio	1.75^a	1.79^a	1.78^a	20.5^b

a,b,c. Means within the same row with different superscripts differ significantly (P<0.05)

Table 5: Finisher phase (5-8weeks)

	Treatment			
Parameters	T_1	T_2	T_3	T_4
Average weight gain	1865^a	1443^b	1721^a	1308^c
Initial weight	764.83	759.21	762.14	691.16
Average daily weight gain	39.29^a	24.42^b	34.25^a	22.03^b
Average daily feed intake	131.23^b	136^a	139.26^a	123.32^a
Feed conversion ratio	3.34^a	5.57^b	4.06^a	5.60^b

a,b,c Means within the same row with different superscript differ significantly (P<0.05)

Weight Gain

Final weight gain in both the starter and finisher phase (Table 4 and 5) were highest for T_1, T_3, T_2 and T_4 in that other. However in the starter phase, there were no significant (P>0.05) different among the treatment groups, whereas in the finisher phase T_1 and T_3 different significantly (P< 0.05) from the others. The poor performances of birds in T4 and T3 in the finisher phase were due to the low protein and high fibre content of cassava peel meal. It has been reported that sun drying proved effectively and reducing the cyanogenic glycoside and phytate content (Aro *et al.*, 2010; Oboh, 2006; Salami *et al.*, 2003., Tewe 1992; Agbola *et al.*, 1985). Cassava peel meal should also not to feed alone as their protein and mineral content cannot support optimum growth. It should also be fortified with micronutrients especially sulphur, phosphorus and vitamin B (Pipal lounglawan *et al.*, 2011; Smith, 1988). The poor performance of the birds in T_4 of the both starter and finisher phase can be attributed to high cyanice and fibre levels in the diet, which interfered with digestion and utilization of nutrient by the birds (Esonu and Udedibie 1993). High weight gain in T3 were because enzyme is believed to reduce digesta viscosity, enhance digestion and absorption of nutrient especially fat and protein, improve apparent metabolizable energy value of the diet, decrease size of gastrointestinal track as well as alter population of microorganism in gastrointestinal track (Campbell et al.1989; Jansson *et al.* 1990;Annison and

Choc, 1991;Leeson and Proulx, 1994; Gill, 2001 and Wang *et al.*, 2005) all of which are believed to enhance weight gain.

Feed Conversion Ratio

The food conversion ratio for the starter phase showed no significant different (P >0.05) between treatment T_1 T_2 and T_3. However, significant different (P <0.05) were observed between T_1, T_2, T_3 and T_4. The finisher phase showed that T_1 and T_3 have the best feed conservation ration. The poor feed conservation ration observed in T_4 were due to high fibre and cellulose content of the diet. Research have shown that broiler birds are easily affected by the fibre content of the feed (Yaakugh *et al*.,1988;Rougiere and Carre,2010). This finding agreed that the inclusion level of cassava meal should be limited. Ogbonna *et al* (2000) recommended an inclusion of role of 5-10% depending of the quality and with appropriate fed formulation. Good feed conversion in T_3 was attributed to increased availability of carbohydrates for energy utilization associated with increased energy digestibility(Mollah, *et al*. 1983; Partridge and Wyatt, 1995)

Feed Intake

Feed intake in the starter phase showed no significant (>0.05) different between the treatment groups. However bird in T_2, T_3 and T_4 consumed more feed than those in the control. In the finisher phase birds in T_2 and T_3 consumed more feed than those in the control. The high feed intake observed can be attributed to high crude fibre and low energy contet of the diet which stimulated better feed intake (Esonu and Udedibie, 1993).It has also been argued that enzyme inclusion reduces the anti-nutritional effect of hydrocyanic acid thus encouraging more feed intake (White *et al.*, 1981).

5. Recommendation

The study made the following recommendation.

- That the inclusion level of sundried cassava peels meal supplemented with natuzyme should not exceed 50 percent.
- Cassava peel meal should be balanced with enough protein, micro nutrient especially sulphur, phosphorus and vitamin B
- Cassava peel meal should be well processed to remove the effect of cyanogenic glycoside and phytate content
- Enzyme supplementation is an economic wastage unless counter balance with protein, sulphur and phosphorus as well as vitamin.

6. Conclusion

Cassava peel meal utilization should be encouraged as the Nigeria presently produces more than 7.04 metric ton of cassava peel meal per year.

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