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Growth Performance Of Finisher Broilers Fed Fish Meal Replaced With Wing Reproductive Termite (*Macrotremes Nigeriensis*) Meal.

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Abstract

An experiment was conducted to evaluate the performance of broiler chickens fed wing reproductive termite (Macrotremes nigeriensis) meal using 150 day old broiler chicks purchased at step by step chicks Dutsen Kura Minna. Flying termite meal was used to replace fish meal at 0, 25, 50, 75 and 100% levels. The five treatments were designated as T_1, T_2, T_3, T_4, and T_5 respectively. Parameters measured include average body weight, average body weight gain, average feed intake and feed conversion ratio as well as nutrient digestibility. The results indicated that there were no significant differences ($P>0.05$) in the average body weight, average body weight gain, average feed intake and feed conversion ratio. The result of nutrient digestibility showed that all the parameters evaluated were significantly affected ($P<0.05$) the results suggest that wing reproductive termite meal could be used to replace fish meal up to 100% level in broiler starter diet without any deleterious effect on performance.

Introduction

The poultry industry in Nigeria has continued to be unstable as a result of high cost of feeds and feeding of low quality feeds. Feeds alone accounts for up to 75% of the total cost of production (Akinmutimi 2007). Adequate nutrition is one of the major inputs necessary for all the full expression of the genetic potentials of poultry and prevention of stress (Adene, 1989).For a diet to be adequate, it must supply the essential nutrients not only in sufficient quantity but also in the right proportions. Diets should therefore be formulated to promote the desired intake of all nutrients and to improve growth rate at a reasonable cost. Less expenditure in terms of feeds and maximum growth rate means more income in the poultry there by alleviating poverty, in both the rural and urban settings. Efforts are being made by researchers to explore the possibility of incorporating unconventional protein feed in order to reduce the cost of feed and maximize the returns from poultry farming (Esonu, *et al.*, 2003).

Termites are members of the order isopteran they live in colonies and have multiple dwelling whose rooms are known as galleries. They are soft bodied insects. Wood borers whose outer layer is known as chitin, they are high in protein. This research creates the obvious need to exploit and expand the production and utilization of other relative non conventional sources of protein in livestock feed. The aim of this study was to evaluate the effect of wing reproductive termite meal on the growth performance of finisher broilers.

Materials and methods

The wing reproductive termites used in this trial were collected within and around Minna, Niger state during the raining season. They were roasted at 80 - 100^{0}C using open flame for up to 3 – 5 minutes in an open pan. The roasted termites were then spread out to cool after which they were milled into wing reproductive termite meal using a hammer mill with a sieve of 3mm. The meal was stored in bags ready for use. The meal produced was used to formulate five iso caloric and iso nitrogenous experimental diet (Table 1).

One hundred and fifty day-old broiler starters purchased from step by step were allotted to the five treatment groups of 30 chicks with 2 replicates each consisting of 15 chicks per replicate in completely randomized experimental design form warmth was provided using 200W electric bulbs. Feed and water were supplied and ad libitum throughout the trial. Other routine management practices were observed. A digestibility trial was carried out to assess the metabolic response of the birds to the using the method of AOAC (1990). All data collected were subjected to analysis of variance using one way ANOVA (Analysis of variance) by steel 1980. Significant differences between means were separated by Duncan multiple range test as outlined by DMRT (1995).

Results and discussion

The of growth performance of birds fed FM diets replaced with wing reproductive termite meal in Table 2 revealed significance difference ($P<0.05$) in the average values of feed intake while the average body weight, body weight gain and feed conversion ratio showed no significance difference ($P>0.05$). This showed that all the birds respond to the diet given. Though average feed intake was low in T_5, the birds grew appreciably. The findings of this work agrees with Solomon *et al* (2007). that WRTW can be an excellent substitute for scarce and expensive fish meal without compromising performance and economic returns. The average digestibility values of Ash increased in response to higher inclusion level of wing reproductive termites (WRTM) in the higher blend with fish meal. The fact that diet T_5 (0%FM:100% WRTW) with highest digestibility values of 90.50% followed by diets T_3 (50%:50% WRTW) is indicative to the fact that WRTW is an excellent protein as inclusion at higher level gave a corresponding increase in digestibility values this agrees with the finding of Olomu and Nwachukwu (1977). The percentage ether extract was

highest for diet T_4 (25%FM: 75%), followed closely by diets T_1, T_3, T_2 and T_4 respectively. In this study, diet T_2(75%FM:25% WRTW) that gave the best digestibility in CP value can be attributed to improved essential amino acid(EAA) balance as WRTW is richer in sulphur containing amino acids. Oluyemi and Roberts (1979) and Olomu (1995) observed that fish meal, apart from being fairly rich in amino acids, also contained unidentified growth factors such as sulphate, polypeptide and some others. Diet T_4 (25%:75% WRTW) gave the highest value of CF.

Conclusion

It was concluded that though broilers could perform well even at 100% inclusion level, optimum utilization will be achieved at 50%FM and 50% WRTW, and this will help in reducing the cost of fish meal in the diets of broilers.

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Table 1:- Composition of experimental diets fed to the birds 1 gradients starter (23%CP).

	Ti	T2	T3	T4	T5
Maize	59.34	58.20	57.25	56.33	55.01
SBM	23.73	24.59	25.31	26.00	26.91
WRTW	-	2.04	4.22	6.50	8.99
Fish meal	7.60	6.14	4.22	2.17	-
Methionine	0.25	0.25	0.25	0.25	0.25
Lysine	0.25	0.25	0.25	0.25	0.25
Oyster shell	1.0	1.0	1.0	1.0	1.0
Salt	0.25	0.25	0.25	0.25	0.25
Bone meal	3.0	3.0	3.0	3.0	3.0
Maize bran	4.0	4.0	4.0	4.0	4.0
Vitamin	0.25	0.25	0.25	0.25	0.25
Determined analysis (DM basis)					
Dry matter (%)	86.98	85.89	86.16	86.83	87.49
Crude protein (%)	21.25	21.00	21.50	21.87	20.5
Ether extract (%)	10.0	10.5	12.00	13.5	14.5
Ash (%)	4.0	5.5	8.5	5.5	4.5
Crude fiber (%)	8.6	8.0	9.0	9.3	10.6
Nitrogen free extract (%)	56.15	55.0	49.0	49.83	49.9

Table 2:- Proximate composition of flying termites meal (WRTW) % and fish meal (FM) %.

Components	(WRTW)%	(FM)%
Dry matter	93.70	91.80
Crude protein	45.61	65.00
Crude fiber	1.44	2.11
Ash	6.01	4.60
Moisture content	6.30	8.20
Nitrogen free extract	12.26	5.29
Energy(cal/g)	543.60	488.16

Table 3:- Performance characteristics of broiler starter chicks fed fish meal replaced with flying termites.

Parameters	T1	T2	T3	T4	T5	SEM
Initial body weight (g)	225.74±48.75	223.63±42.27	253.32±41.39	220.11±38.49	246.53±43.11	116.4 NS
Average body weight(g)	892.77±131.45	864.19±124.88	885.23±142.06	806.48±129.24	837.06±123.54	55.47NS
Average body weight gain(g)	225.84±53.72	252±66.89	270.14±72.65	246.23±64.65	235.48±60.70	27.23NS
Average feed intake(g)	69.61 ± 2.85^{ab}	68.48 ± 3.73^{ab}	73.96 ± 2.90^{b}	66.59 ± 2.44^{ab}	61.12 ± 1.89^{a}	1.37*
Feed conversion ratio	0.40±0.70	0.38±0.06	0.40±0.07	0.41±0.08	0.37±0.07	0.03NS

ab mean values in the same row are significantly different ($P<0.05$)
NS - Not significantly different
* - significantly different
SEM – standard Error of mean

Table 4:- Nutrient digestibility of broiler starters fed FM diet replaced with FTM.

Nutrients	T1	T2	T3	T4	T5	SEM
DM (%)	74.24^{e}	96.87^{c}	96.99^{d}	96.60^{b}	94.80^{a}	0.30*
CP (%)	96.79^{d}	96.92^{e}	95.90^{b}	94.58^{a}	96.74^{c}	0.20*
CF (%)	52.37^{d}	14.40^{a}	27.37^{c}	68.23^{e}	27.29^{b}	6.51*
EE (%)	95.73^{d}	95.10^{b}	95.32^{c}	97.14^{e}	94.76^{a}	0.28*
ASH(%)	84.83^{c}	81.77^{a}	87.49^{d}	83.83^{b}	90.50^{e}	1.01*
NFE (%)	93.33^{b}	93.67^{c}	93.34^{b}	93.12^{a}	95.42^{d}	0.28*

Different superscripts (a, b, c, d, e) within row indicate significant ($P<0.05$) differences.