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EFFECT OF ROASTED *LEUCAENA LEUCOCEPHALA* LEAF MEAL ON THE PERFORMANCE OF BROILER CHICKENS

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ABSTRACT

The effect of graded dietary levels of roasted *Leucaena leucocephala* leaf meal (RLLM) on performance of broiler chickens was studied. Three hundred and twenty broiler chickens, 4 weeks of age, were randomly allotted to four dietary levels (0, 5, 10 and 15%) of RLLM in iso nitrogenous diets. The RLLM replaced soya bean meal at those levels. Feed and water were provided *ad libitum*. The experiment lasted for 4 weeks. Results indicated that there were no significant (P>0.05) treatment effects on average daily feed intake, average daily gain, and feed conversion ration. Eviscerated weights, breast, drumstick and thigh, wing, neck, gizzard, liver and bile, hear and spleen weights as percent of live weight were also not significantly (P>0.05) affected. Results showed that substituting RLLM for soyabean at 5, 10 and 15% of the diet was not beneficial in reducing the total cost of proudcution. Based on the data obtained, further studies using higher levels of RLLM in broiler fed are recommended.

KEY WORDS: Roasted *Leucacena leucocephala* leaf meal, broiler chickens, carcass characteristics.

INTRODUCTION

Poultry production in many parts of the troipcs and sub- tropics is limited by availability of protein sources. The escalating cost of the available sources of protein is a consequence of competition between man and poultry thus resulting in high cost of poultry production. The search for cheaper sources of protein that would be available all year round has led to the consideration of *Leucaena leucocephala*. an evergreen tropical woody leguminous shrub and tree.

Luecaena leucocephala leaf meal (RLLM) is a rich source of plant protein, minerals, carotene and xanthophylls (NAS, 1977). Okonkwo and Alhassan (1997) reported that the leaf meal Enhances egg production and egg yolk Pigmentation; and that broilers placed on the leaf meal had improved carcass and shank colouration.

However, utilization of *Leucaena leucocephala* leafmeal in poultry ration is limited due to it's content of mimosine, an intrinsic factor which manifests itself by depressing growth, feed intake, and causing death (D' Mello and Thomas 1978). Mimosine tozicity has been reported to be reduced by heating the fresh leaves. This treatment also increases its feeding value. These processes of heat treatments however. caused rapid destruction of carotene and xanthophylls as a major source of provitamin A or pigmenting for poultry (Wood and Cartner, 1983).

In Nigeria, *Leucaena leucocephala* is not consumed by humans, and as such can be meaningfully employed in feeding chickens to reduce the total cost of poultry production. This work therefore was undertaken to:

(i) Evaluate the performance and carcass characteristics of broiler chickens fed roasted *Leucaena leucocephala* leaf meal.
(ii) Determine the cost reduction achieved by feeding roasted *Leucaene leucocephala* leaf meal.
(iii) Determine the optimal level of which roasted *Leucaena leucocephala* leaf meal could be included in broiler diets.

MATERIALS AND METHOD

Three hundred and twenty four week - old broiler chickens were used in the experiment. The birds were placed in deep litter pens with feed and water provided *ad libitum* throughout the experimental period. The birds were randomly assigned to treatments and placed on the experimental diets where soyabean meal was replaced by RLLM at 0,5,10 and 15% levels. RLLM was prepared by roasting the stripped leaves from the petiole in an open pot till they were dry and brownish black in colour, allowed to cool and crushed between the palms.

Completely Randomized Design (CRD) was employed which involved four treatments each of 80 birds that were further replicated four times with 20 birds per replicate. At the commencement of the experiment the birds were weighed. The

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TABLE 1 :Chemical composition of Roasted *Luecaena leucocephala* leafmeal (RLLM)

NUTRIENT COMPOSITION	RLLM
Crude protein	32%
Crude fibre	16.76%
Ash	9.34%
Fat	1.70%
ME (kcal/kg)	391.66

TABLE 2 : COMPOSITION FO EXPERIMENTAL DIETS (BROILER FINISER)

INGREDIENTS	LEVELS OF RLLM IN THE DIET (%)			
	0	5	10	15
RLLM	0.00	1.40	2.80	4.20
SOYABEAN	28.00	26.60	25.20	23.80
MAIZE	58.00	58.00	58.00	58.00
WHEAT OFFAL	9.00	9.00	9.00	9.00
FISH MEAL	2.00	2.00	2.00	2.00
BONE MEAL	2.50	25.00	2.50	2.50
VITAMIN PREMIX*	0.10	0.10	0.10	0.10
LYSINE	0.10	0.10	0.10	0.10
METHIONINE	0.10	0.10	0.10	0.10
CALCULATED ANALYSIS·				
ME (KCAL/KG)	2973.22	2940.90	2908.59	2876.25
CRUDE PROTEIN	20.95	20.78	20.61	20.45
CRUDE FAT	3.71	3.68	3.65	3.63
CRUDE FIBRE	3.71	3.91	4.05	4.18
PHOSPHORUS	0.68	0.68	0.67	0.67
LYSINE	1.20	1.16	1.12	1.08
METHIONINE	0.45	0.44	0.44	0.43

*Vitamin premix supplied per kg diet vitamin A, 10,000 IU; vitamin D_3, 2000 ICU; vitamin E, SIU; Vitamin K, 2.24mg; riboflavin, 5.5mg; vitamin B12, 10mg; calcium panthtenate, 10mg; niacin, 20mg; choline cloride, 250mg; folicacid, 1mg; managanese, 56mg; zinc, 50mg; copper, 10mg; Iron, 20mg; cabalt, 1025mg; amprolium, 125mg and tetracydire, 100mg.

TABLE 3 : Effect of roasted *Leucaena leucocephala* leafmeal (RLLM) on the performance of broiler chickens.

Performance Characteristics	LEVELS OF RLLM IN THE EXPERIMENTAL DIETS (%) 0	5	10	15	SEM
Average initial live weight (g)	795.00	790.00	785.00	765.00	41.03
Average Final Live weight (g)	1932.50	1945.00	1935.00	1940.00	51.07
Average daily feed Intake (g/bird/day)	135.53	144.91	144.91	146.69	4.87
Average daily gain	60.74	61.86	61.86	62.54	7.05
Feed conversion Ration (gain/Feed)	2.32	2.42	2.42	2.45	0.24

Sem = Standard Error of Means

TABLE 4 : Effect Of Roasted *Leucaena Leucocephala* Leaf meal (RLLM) On Carcass Characteristics And Organ Weights Of Broiler Chickens.

Characteristics	Levels of RLLM in the experimental Diet 0	5	10	15	SEM
Carcass weight as % of live weight	98.14	86.72	87.08	88.98	1.84
Eviscerated weight as % of live weight	64.76	62.40	62.26	62.30	1.54
Dressed weight as % of line weight	61.12	59.47	59.14	62.30	1.58
Breast weight as % of live weight	18.79	18.23	17.92	18.57	0.99
Thing and drumstick as % of live weight	10.21	10.06	9.83	4.55	0.25
Wing weight as % of live weight	4.24	4.10	4.09	4.56	0.19
Neck weight as % of live weight	3.12	2.72	2.81	3.07	0.12
Gizzard weight as % of live weight	2.03	1.94	1.81	1.96	0.09
Liver and bile weight as % of live weight	2.47	2.52	2.85	2.79	0.16
Heart weight as % of live weight	0.42	0.40	0.45	0.49	0.03
Spleen weight as % of live weight	0.10	0.09	0.12	0.09	0.04

Sem = Standard Error of Means.

birds and feeds were subsequently weighed weekly to determine the average daily gain and corresponding average daily feed intake. Other parameters measured included feed conversion ratio, percent mortality and economics of feeding RLLM to broilers.

At nine weeks of age, two birds per replicate i.e. 8 birds per treatment were randomly removed and fasted for 18 hours before being slaughtered by cervical dislocation. The dressed weights of carcasses and body parts (drumstick and thigh, wing, neck, breast) and organs (liver and bile, spleen, gizzard and heart) were recorded and expressed as percent of live weight.

All data were analyzed by one-way analysis of variance by procedure of General Linear Models (least-square), using SAS/STT procedure for personal computers (SAS 1986). Duncan's New Multiple Range Test was used to determine the difference among means where F was significant. (Steele and Torrie 1960).

RESULTS AND DISCUSSION

The chemical composition of RLLM used in the study is presented in table 1. The crude protein content is higher than the 25.25% reported by Ekpenyong (1986). The increase was probably due to heat treatment of the leaves which is reported by NAS (1977) as increasing the nutrient content and thus the feeding value.

The composition and calculated analysis of the experimental diets are shown in Table 2. Soyabean meal was replaced by RLLM at 0, 5, 10 and 15% levels.

Average performance data are presented in table 3. Average live weights increased progressively from initial live weights throughout the four weeks. Birds on 5% RLLM were numerically superior at the end of the observations most probably because their initial liveweights were the highest., while those of 0% RLLM recorded the lowest for similar reason. However, there were no significant (P>0.05) treatment differences. NFTA (1984) reported depressed growth as a consequence of feeding heat - treated leafmeal. in this study dietary RLLM did not depress growth.

Average daily feed intake increased numerically with the inclusion of RLLM in the diet. The increase may not be unconnected with the low metabolizable energy value associated with Leucaena leaf meal (D'mello and Acamovic, 1982). However, there were no significant (P>0.05) treatment differences.

Birds on 5% RLLM diet recorded the highest numerical weight gain while birds on 0% RLLM recorded the lowest. However, there were no significant (P>0.05) treatment differences. However, no significant (P>0.05) treatment effects were observed. The ratios, however showed that the treatments did not have any detrimental effect on feed intake and consequently on the growth of the birds.

Data on carcass characteristics and organ weights, expressed as percent of liveweight are presented in Table 4. The data indicated no significant (P> 0.05) treatment effect on the carcass, eviscerated or dressed weights, breast, thigh and drumstick, wing and neck. Organ weights (Gizzard, liver and bile, heart and spleen weight) showed no significant treatment effects indicating that RLLM has no harmful effect on the birds.

Data on percent mortality are presented in Table 5. Birds on 0 and 15% RLLM recorded mortality of 37.50% each while those of 5% and 10% recorded 5% each. The trend indicated that mortality did not have any relationship with dietary treatment.

The economic evaluation of substituting soya bean meal with roasted *Leucaena leucocephala* leaf meal (RLLM) as used in the study is presented in Table 6. The cost per kg of soyabean and RLLM were ₦50 and ₦17.06 respectively. Birds on 5% RLLM recorded a higher total cost of soyabean and RLLM of ₦57.72 per bird while birds on 15% RLLM had the least cost of N 555.52 per bird. Those on 0% and 10% RLLM recorded N56.93 per bird and N56.86 per bird respectively. A cost reduction of N1.40k was achieved for birds fed 15% RLLM. This cost reduction was low considering the cost of soyabean/kg and RLLM/kg. From the table it can be deduced that the level of RLLM used in the study was low compared to that of soyabean, and as such could not reduced the cost to a substantial level as expected.

TABLE 5 : Effect Of Rllm On Mortality Of Broiler Chickens.

Total	Levels of RLLM in the experimental Diets (%)				
	0	5	10	15	SEM
No. of birds	80	80	80	80	320
Mortality	3	4	4	3	14
% Mortality	3.75	5.00	5.00	3.75	4.38

TABLE 6 : Economic evaluation of selected levels of RLLM in broiler chicken diets.

	Levels of RLLM the experimental Diets (%)			
	0	5	10	15
Quantity of soyabeans used (kg)	91.08	90.72	87.64	83.79
Quantity of RLLM used (kg)		4.77	9.74	14.79
Cost of soyabean in ₦/bird	56.93	56.70	54.78	52.37
Total cost of soyabean and RLLM ₦/bird	56.93	57.72	56.86	55.52

CONCLUSION

Since the aim of the broiler industry is to produce birds with high carcass yield, then the value of any new feed ingredient would be measured by its ability to enhance growth and carcass yield, and also its relative cost and availability compared to those of the conventional feed ingredients. Results of this study have shown that performance and carcass yield of broilers on 5%, 10% and 15% RLLM were statistically similar in all cases to those of the control birds and no harmful effect arose from feeding RLLM as such, RLLM can replace soyabean in broiler rations without any adverse effect on production. Economically, the use of RLLM did not reduce the total cost per bird as expected even though it cost ₦17.06 per kg compared to ₦ 50 per kg for soyabean.

It seems that the level of inclusion of RLLM in this study was low and as such could not reduce the cost of feed per bird. There is therefore a need for further studies with higher levels of RLLM on the performance of broiler chickens to ascertain its appropriate inclusion level.

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