Effects of Varying Levels of *Leucaena Leucocephala* Leaf Meal Diet on the Growth Performance of Weaner Rabbit

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ABSTRACT

This study examines the effect of varying levels of Leucaena leucocephala leaf meal diet on the growth performance of weaner rabbit. The purpose of this study is to examine the nutritional worth of including Leucaena leucocephala leaf meal as a plant protein source in the diet of rabbits. Twelve weaner rabbits were used for the study with four diet groups containng 0, 5, 10 and 15% Leucaena leucocephala leaf meal and measurements taken in a 50 day experimental period were: final body weight gain, feed intake, feed efficiency ratio, and digestibility coefficient for crude protein, crude fibre, ether extract and ash contents. Three rabbits were randomly allotted to each dietary treatment after balancing for sex and body weight, and kept in individual pens. Data collected were subjected to analysis of variance. Results show that the body weight gain of the rabbits decreased as the proportion of Leucaena leucocephala leaf meal in the diets increased, except with 10% inclusion. The final body weights were 1.23kg, 1.12kg, 1.29kg, and 1.00kg for 0, 5, 10 and 15% inclusions, respectively. Average daily feed intake and feed conversion ratio were 106.7, 109.8, 109.6 and 73.9kg and 7.13, 10.54, 6.88 and 12.29 for the respective diets/inclusions. Digestibility coefficient for crude protein, crude fibre, ether extract and ash contents were not significantly influenced by the dietary treatments. Though the study asserts that Leucaena leucocephala leaf meal had adverse effects on the feed intake, body weight gain, nutrient digestibility, and growth performance when it is included in the ratio beyond 10% level of rabbit diet, yet the inclusion of 10% Leucaena leucocephala leaf meal in the diet of weaner rabbits ensured optimum performance and is, therefore encouraged as a healthy practice.

Keywords: *Leucaena leucocephala, leaf meal, weaner rabbit, growth performance, digestibility*

INTRODUCTION

The common sources of animal proteins are cattle, sheep, goats, poultry and pig. The high cost associated with the production of these animals has constituted a setback in the livestock industry. There is an increasing interest in rabbit production which, in turn, has provoked academic researchers to probe into alternative sources of high-quality plant proteins in the rabbit diet. With increasing scarcity of animal protein and the high cost of commercial feed, particularly in the developing countries, forage, after being converted to meat, may play an important role in enhancing the quality of human food (Cheeke, 1983). One of such alternative plant protein sources that is locally available and can ensure sustainability of the production is *Leucaena leucocephala* which is common in various locations. It has been found to be useful as animal feed, fuel, ground cover, fertilizer, and wind breaker (Kang, Grimme and Lawson, 1985), in addition to its enormous potentials in afforestation and agroforestry (ILCA, 1986). The trees, leaves and shrubs form a natural part of the diet of many ruminant species, and have been used traditionally as sources of forage for domesticated livestock in Asia, Africa and the Pacific (Skerman, Cameron and Riveros, 1988; NAS, 1984).

Leucaena leucocephala could be incorporated into the diet of rabbit. Leucaena, being a legume, is rich in proteins and other nutrients. Jones (1979) showed that *Leucaena* leaves have been fed to livestock with some degree of success. Equally too, Glasby, (1975) report that the use of *Leucaena leucocephala* at high dietary levels from 40% upward has been limited by the toxic amino acid named mimosine present in its leaves, stems and seeds. Otesile and Akapokodje (1987) indicate that in spite of the nutritive potential of *Leucaena leucocephala*, its use by cattle as feed may result in certain undesirable effects. *Leucaena* levels should not exceed 30% for ruminants, 20% for rabbits, and 75% for poultry on a dry matter basis (Barry, 1987). The anti-nutritional factor present therein, i.e. mimosine, has limited the percentage that can be included in the diet. However, some animals have built resistance with microorganisms that can degrade the mimosine and its product (Palmer, Jones, Poathong and Chobtang, 1986). Therefore the purpose of this study is to examine the nutritional worth of including Leucaena leucocephala leaf meal as a plant protein source in the diet of rabbits.

MATERIALS AND METHODS

Fresh *Leucaena leucocephala* leaves were obtained from Ladoke Akintola University of Technology Teaching and Research Farm, Ogbomoso. The leaves were wilted under the shade and later sun-dried until practical dryness was achieved. After this, the dried leaves were crumbled into small sizes or particles in order to obtain *Leucaena leucocephala* leaf meal. Proximate chemical composition (table 1) was determined according to A.O.A.C. (1980). Twelve weaner rabbits of mixed sexes and breeds, weighing 625 to 637g, were allotted into four dietary treatment groups. Three rabbits were randomly allotted to each dietary treatment after balancing for sex and body weight, and kept in individual pens. *Leucaena leucocephala* leaf meal (LLLM) replaced the basal diet of concentrate, weight

for weight (0, 5, 10 and 15%). An average of 150g of each diet was offered daily per rabbit and left-over portions collected, weighed and sampled for laboratory analysis. Water was given *ad libitum*. The rabbits were weighed weekly while the growth and digestibility trials lasted 35 days and 15 days, respectively. At the end of the growth study, three rabbits in each treatment were placed in individual metabolic crates. An adjustment period of 5 days before a 7 day preliminary period and a 3 – day collection period was allowed. Proximate chemical composition of the experimental diets and faecal samples was also determined using A.O.A.C (1980) methods (table 2). Data collected were subjected to analysis of variance.

RESULTS AND DISCUSSION

The results on table 3 show that feed intake of the rabbits increased from the control diet to diet C (LLLM 10% inclusion) but significantly decreased in diet D (LLLM 15% inclusion). The effect of *Leucaena leucocephala* leaf meal was significant on their body weight gain. The average live-weight gain increased with increasing level of LLLM up to 10% inclusion before it declined. The final weight showed that both the control diet (A) and LLLM 10% inclusion (C) groups were significantly higher than diets B and D groups. Feed conversion ratio was the best for the rabbits in diet C (LLLM 10%) – 6.88. For both diets A and C, the feed conversion ratio was significantly similar. The highest dry matter intake was recorded with the control diet (A) and was significantly higher than with diets B, C and D. There was also significant variation in the faecal output among dietary treatments with diet D having the highest faecal output. On table 4, rabbits in diet C had the highest value for crude protein digestibility while dietary treatment D had the lowest. Significant similarities were recorded with crude fibre and ether extract for all dietary treatments.

The crude protein and ash contents of *Leucaena leucocephala* leaf meal are within the range reported by Vohra, Herrick, Wilson and Slopes (1972) (Table 1). The nutrient composition is also similar to that recorded by Carew, Mosi, Mba and Egbunike (1980). The nutrient composition values also portray Leucaena to be on the high side when compared to banana leaf meal, cassava leaf meal, cassava leaf and wild sunflower. It also compares favourably well with conventional feedstuffs such as wheat bran, dried brewers grain, maize offal and palm kernel cake. The rabbits fed *Leucaena leucocephala* leaf meal up to 10% level had the best performance, with the highest feed intake, lowest feed conversion ratio and highest body weight gain. The significantly lower feed intake in diet D at 15% level of LLLM could be the result of the decrease in palatability and increased fibre content as the level of *Leucaena* increased. The average feed intake correlates with the body weight gain that increased up to 10% level (diet C) and is similar to the growth response under the control before it declined with further increase in the inclusion level. This could be attributed to reduction in metabolised energy value as observed in the feeding of wild sunflower (Odunsi, Farinu and Akinola, 1996). The final weight which increased up to 10% level of *Leucaena* and which was similar to the final weight in the control diet also correlates with the decreased dry matter intake. This may have resulted from anti-nutritional factors implicated in the *Leucaena* leaves (Bindon and Lamond, 1966).

CONCLUDING REMARKS

This study assesses the effect of varying levels of Leucaena leucocephala leaf meal diet on the growth performance of weaner rabbit. The study observes that increase in the level of LLLM beyond 10% (diet C) leads to a decrease in feed intake and feed conversion efficiency as the average body weight gain and final weight gain also decreased with diet at 15% level (diet D). The reduced digestibility of diet with 15% level inclusion could be due to the amount of anti-nutritional factor present at that level though this was not analysed. Also at this level (15% inclusion), experimental animals suffered a severe case of alopecia. It could therefore be asserted that Leucaena leucocephala leaf meal had adverse effects on the feed intake, body weight gain, nutrient digestibility and growth performance when it is included in the ratio beyond 10% level of rabbit diet.

Table 1: Proximate Chemical Composition of Leucaena leucocephala Leaf Meal

Components	**%**
Crude Protein	21.88
Crude Fibre	13.85
Ether Extract	8.02
NFE	46.33
Ash	9.92

Source: Experimentation, 2012

Table 2: Proximate Chemical Composition of Experimental Diets (%)

Ingredients	**Control (A)**	**LLLM 5% (B)**	**LLLM 10% (C)**	**LLLM 15% (D)**
Maize	31.16	29.51	27.84	27.30
GNC	28.80	27.14	25.47	23.80
Maize Offal	36.52	34.85	33.19	30.52
Bone Meal	3.00	3.00	3.00	3.00
Salt	0.25	0.25	0.25	0.25
Premix*	0.25	0.25	0.25	0.25
LLLM	-	5.00	10.00	15.00
Calculated Analysis				
CP (%)	20.20	20.08	20.08	20.10
CF (%)	5.45	6.82	7.19	7.48

*Vita A = 8,000,000iu;
Vit D = 1,500iu;
Vit E = 3g;
Vit K = 23g;
Calcium D Pantothenate = 3g:
Vit B6 = 0.3g;
Vit B12 = 8mg;
Mn = 10g;
Zn = 4.5ag;
Cu = 0.2g;
1 = 0.15g,
Va = 0.02g;
Se = 0.01g.

Source: Experimentation, 2012

Table 3: Mean Values for Performance Characteristics of Weaner Rabbits Fed on Three Levels of Leucaena leucocephala Leaf Meal.

Parameter	Control (A)	LLLM 5% (B)	LLLM 10% (C)	LLLM 15% (D)	SEM
Initial weight (g)	625.00	628.00	631.00	637.00	10.71
Final Body Weight (g)	1226.83	1118.00	1292.00	1003.93	26.00
Daily Feed Intake (g)	746.67	768.37	769.20	517.63	11.90
Daily Weight Gain (g)	120.30	85.38	132.26	67.39	1.38
Feed Conversion Ratio	7.13	10.54	6.88	12.29	1.09
Dry Matter Intake (%)	94.54	74.00	79.49	51.69	2.90
Faecal output (g)	4.42	7.43	5.98	12.34	2.88

Source: Experimentation, 2012

Table 4: Nutrient Digestibility of Weaner Rabbits Fed on Three Levels of Leucaena leucocephala Leaf Meal (%)

Ingredients	Control (A)	LLLM 5% (B)	LLLM 10% (C)	LLLM 15% (D)
CP Digestibility	96.70	95.70	97.10	81.80
CF Digestibility	88.83	77.80	88.50	73.57
EE Digestibility	98.34	93.97	93.07	90.43
Ash Digestibility	90.40	80.83	93.90	84.50

Source: Experimentation, 2012

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