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Full Length Research Paper

Growth Performance and Haematological Values of West African Dwarf (WAD) Goats Fed *Leucaena, Gliricidia* and Cassava Leaf Meal – Cassava Peel Based Diets

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A 56days experiment was conducted to determine the effects of *Leucaena, Gliricidia* and cassava leaf meal – cassava peel based diets on the growth performance and haematological values of WAD goats. Nine weaner bucks aged 6-7months and averaging 6.3kg in weight were divided into 3 groups of 3 animals and each group randomly assigned to one of the treatments in a Completely Randomized Design. Each animal received each diet for 56 days. Parameters measured were feed intake, body weight gain (BWG), feed conversion ratio (FCR), packed cell volume (PCV), haemoglobin (Hb), white blood cells (WBCs), red blood cells (RBCs) and mean corpuscular haemoglobin concentration (MCHC). Feed intake was 298.54, 311.04 and 294.82g/d for diets A, B and C respectively. These values were significantly different (P<0.05). Goats on diet B had the least FCR (8.42) which was significantly different (P<0.05) from the FCR 0f goats on diet C (8.80) and diet A (9.95). Body weight gain (g/d) was significantly different (P<0.05) and was highest for goats on diet B. Hb values were significantly different (P<0.05) with the highest in goats that were on diet C. MCHC values were significantly different (P<0.05) and was highest for goats on diet C. Diet C appeared to be the best in terms of haematological values while diet B had the best body weight gain.

Keywords: Cassava, *Gliricidia*, goat, growth, haematology, *Leucaena.*

INTRODUCTION

Goats were first domesticated about ten thousand years ago in the Tigris – Euphrates valley in South Western Asia (Okereke, 2003). The domesticated goat (*Capra hircus*) is now found throughout the continent in many forms including Nigeria with a population of 29.2million (FAO, 2005). In Nigeria the rearing of goats is mainly traditional and as a result, it is characterized by inadequate feeding. This has necessitated the search for non – conventional feedstuffs which are cheap and not in high demand by humans (Amaefule, 2002). Cassava leaf has high protein content (16.7 – 39.9%) (Yousuf et al., 2007) with almost 85% of the crude protein as true protein (Ravindran, 1993). Leaves of *Leucaena leucocephala* and *Gliricidia sepium* plants have been reported (Shelton and Brew baker, 1994; Yousuf et al., 2007) as valuable forage supplements to ruminants consuming low protein diets.

The study is aimed at comparing the protein supplementary value of cassava leaf meal with that of *Leucaena* or *Gliricidia* leaf meals in goats fed cassava peel based diets.

MATERIALS AND METHODS

The cassava peels used for this trial were collected from the garri processing unit of the National Root Crops Research Institute, Umudike, Abia State and were sundried on a concrete floor for 3-5 days depending on

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Table 1. Experimental diets

Ingredients	Diets		
	A	B	C
Cassava peels	47	47	47
Gliricidia sepium	15	-	-
Cassava leaves	-	15	-
Leucaena leucocephala	-	-	15
Palm Kernel Cake	18	18	18
Brewers' dried grain	12	12	12
Soya bean meal	5	5	5
Bone meal	2	2	2
Common salt	1	1	1

Table 2. Proximate composition of the experimental diets

Ingredients (%)	Diets		
	A	B	C
Dry matter	67.22	78.29	75.32
Crude protein	26.95	24.94	28.10
Crude fibre	13.62	11.53	12.77
Ether extract	4.29	4.41	3.56
Ash	3.81	2.32	2.16

the intensity of the sun. The sundried cassava peels were then milled and bagged for feed formulation. Cassava leaves were collected during cassava tuber harvest from 6month old plants. The cassava, *Gliricidia sepium* and *Leucaena leucocephala* leaves were sundried for 3days until they become crispy while still retaining the green colouration. After sun-drying, they are milled and bagged for feed formulation.

Experimental animals and management

Nine West African Dwarf (WAD) bucks aged between 6-7months and weighing averagely 6kg were for 21days, dewormed and treated with appropriate acaricides. Each animal was later housed individually in a well ventilated cement floored pen equipped with feeding and watering troughs. All the animals were weighed and divided into three groups of three animals each. The three experimental diets (Table 1) were randomly allotted to the three animal groups. Each animal within a group received 1kg daily of an assigned diet for 60days. Portable drinking water was provided for each animal *ad libitum.* Voluntary feed intake was determined daily for each animal by subtracting the feed refusals from daily feed served. Daily feed intake and weekly weight were recorded for each animal.

Blood collection

Blood was collected from the animals on the last day of the experiment. The animals were restrained and sterilized hypodermic needles were used for blood collection through the jugular vein. The area was first cleaned with surgical spirit to remove excess bacteria and debris. Blood was collected into plastic tube containing EDTA for haematological studies. Blood samples were deposited into anticoagulant free plastic tube and allowed to clot at room temperature. Total erythrocytic and leucocytic counts were determined with the aid of Neubaur counting chamber (Haemocytometer) while Hb concentration was determined by Sahl's method (Benjamin, 1978).

Statistical Analysis

Mean values and standard errors were calculated. The data were subjected to student t-test (Steel and Torrie, 1980).

RESULTS AND DISCUSSION

The proximate composition of the experimental diets is shown in Table 2.

Table 3. Performance of WAD goats fed *Leucaena*, cassava and *Gliricidia* leaf meals-cassava peel based diets

	Diets			
Parameters	**A**	**B**	**C**	**SEM**
Initial weight(kg)	6.40	6.31	6.29	0.18
Final weight(kg)	8.08	8.38	8.17	0.35
Total feed intake(kg)	15.71^{b}	16.41^{a}	15.67^{c}	0.08
Feed intake (g/d)	298.54^{b}	311.04^{a}	294.82^{c}	0.02
Body weight gain(g/d)	30.00^{c}	36.96^{a}	33.50^{b}	0.05
Feed conversion ratio	9.95^{a}	8.42^{c}	8.80^{b}	0.17

^{ab}Means on the same row with different superscripts differ significantly(P<0.05)

Table 4. Haematological characteristics of WAD goats fed *Leucaena*, cassava and *Gliricidia* leaf meals - cassava peel based diets

	Diets			
Parameters	**A**	**B**	**C**	**SEM**
WBCs x10^{3}/ul	16.07	16.33	16.20	0.06
RBCs x10^{6}/ul	10.80	10.53	10.50	0.03
PCV (%)	28.30	28.80	28.40	0.22
Hb (g/dl)	10.30^{c}	10.80^{b}	11.10^{a}	0.19
MCHC (%)	34.73^{c}	34.83^{b}	38.98^{a}	0.09
Neutrophils (%)	48.20	47.94	48.01	0.20
Lymphocytes(%)	46.11	45.26	45.21	0.05
Eosinophils (%)	2.67	2.67	2.51	0.03
Monocytes (%)	0.08	1.03	1.01	0.08

^{ab}Means in the same row with different superscripts differ significantly (P<0.05)
Where
WBCs = White blood cells, RBCs = Red blood cells, PCV = Packed cell volume
Hb = Haemoglobin, MCHC = Mean corpuscular haemoglobin concentration.

The dry matter contents of the experimental diets were 67.22, 78.29 and 75.32 for diets A, B and C respectively. The crude protein contents of the diets were within a range of 24.93 – 28.10% and fell within the range reported by Limcango-Lopez 1997; Ayodeji, 2005 and Yousuf et al 2007. The crude fibre contents of the diets were 13.62, 11.53 and 12.77% for diets A, B and C respectively.

The performance of the West African Dwarf goats fed the experimental diets is shown in Table 3. The initial and final body weights of the goats fed the experimental diets were not significantly different (P>0.05). Total feed intake (kg) was significantly (P<0.05) different with diet B having the highest feed intake. The highest feed intake indicates a better acceptability, however, feed intake had been observed to be governed by some other factors apart from dietary crude protein and palatability.

These include gut fill, body fat and changes in body chemical constituents (F. O. Ahamefule (2005) Michael Okpara University of Agriculture, Umudike, Nigeria, Thesis; A. I. Ukanwoko (2007), Michael Okpara University of Agriculture, Umudike, Nigeria, Thesis). There were significant differences (P<0.05) in the body weight gain (g/d). It followed the same trend as the total feed intake. Diet B had the highest body weight gain followed by diet C and then diet A. There were significant differences (P<0.05) in the feed conversion ratios of the diets. Diet B which had the least feed conversion ratio supported relatively the highest weight gain. This tended to be in line with A. I. Ukanwoko (2007) (Michael Okpara University of Agriculture, Umudike, Nigeria, Thesis) and Yousuf et al. (2007).

The haematology of WAD goats fed *Leucaena*, cassava and *Gliricidia* leaf meals in a cassava peel based diet are presented in Table 4. There were significant differences (P<0.05) in the values of the haemoglobin concentration of the goats. The values recorded in this study fell within the range of 10.30 -11.10 and they compare favourably with the range of 7-15g/d reported for WAD goats by Daramola et al (2005). The packed cell volume (PCV) did not differ significantly (P>0.05). The PCV range of 28.30-28.80% reported in this study is lower than the range of 32-45% PCV reported by Banerjee (2005) but falls within the range of 21-35% reported by Daramola et al. (2005). There were significant (P<0.05) differences in the MCHC values of

the WAD goats. The MCHC range of 34.73-38.98% reported in this study was in line with what Banerjee (2005) reported.

CONCLUSION AND RECOMMENDATION

Results from this study showed that goats that fed on *Leucaena*, *Gliricidia* and cassava leaf meals-cassava peel based diets had enhanced growth performance. In terms of their body weight gain, the goats on the cassava leaf meal – cassava peel diet (diet B) followed by diet C (*Leucaena* diet) and diet A (*Gliricidia* diet). However in terms of haematological indices, Hb (g/dl) was highest in diet C followed by diet B and then diet A.

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