

EFFECT OF *Cajanus cajan* LEAF MEAL IN TOTAL MIXED RATIONS ON THE GROWTH PERFORMANCE OF WEST AFRICAN DWARF RAMS

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ABSTRACT

An experiment was carried out to investigate the growth performance of West African dwarf growing rams fed diets containing varying inclusion levels of *Cajanus cajan* leaf meal (CCLM) and *Panicum maximum* for 56 days feeding trial which was carried out at Teaching and Research Farm of Oyo State College of Agriculture and Technology Igbo-ora, Nigeria. A total of sixteen (16) growing WAD rams between 6 - 9 months with an average body weight of 9.00 -12.00kg were randomly allocated to 4 treatments with 4 animals per treatment while 2 animals served as replicate. The experimental diet was fed at 3% body weight of individual animals while *Cajanus cajan* leaf meal was supplemented in total mixed rations at varied inclusion levels (0%, 5%, 10% and 15%) with *Panicum maximum*. There were significant ($P<0.05$) difference in all parameters determined across the dietary treatments. The results revealed that rams fed diet T_2 recorded the least daily weight gain (8.04g/d) while the highest daily weight gain (15.36g/d) was recorded in diet T_4 that contained 15% inclusion level of CCLM. The weekly weight gain of rams was significantly different across all treatments ($P<0.05$). The feed conversion ratio (FCR) range between 22.03 – 41.16 showed significantly different across all treatments. Hence, rams fed diet T_4 that contained 15% inclusion levels of CCLM in total mixed rations recorded the best feed utilization value of 22.03. It can be concluded that supplementation of CCLM in diets of growing rams up to 15% enhance the growth performance of the animals.

Keywords: Tropical grass, *Cajanus cajan* leaf meal, WAD rams, Growth performance.

INTRODUCTION

Forages such as grasses and legumes are the main source of feed for ruminants to meet their nutritional requirements, either for maintenance or production. However, in the tropics, inadequate nutrition is a great challenge contributing to production losses in ruminants (Ibhaze, 2016) due to unavailability of forages throughout the year. This unpleasant situation has necessitated the search for alternative feed resources rich in energy and protein that are readily available and relatively cheap. Several indigenous and exotic browse species have been investigated and evaluated for inclusion in ruminant feeding systems in Nigeria (Fajemisin, 2015). The shortage in feed supply due to high cost and seasonality has caused ruminant livestock farmers to search for alternative feed resources that are inexpensive and readily available and which are not directly required as a component of human dietaries and can economically supplement the feed ingredients in rations without adverse effects on the rumen microbial fermentation and performance of the animals (Okoruwa *et al.*, 2013). Tropical browse plants such as *Cajanus cajan* is multipurpose nitrogen fixing crop that provides the seed as human food and poultry feed, the leaves and young stems as animal fodder for the subsistence farmers (Lorgyer, 2009). *Panicum maximum* also called guinea grass (FAO, 2003) is a highly productive, palatable, persistent and acceptable grass by ruminants. It can be fed to livestock solely or with concentrates or legumes. This study was therefore designed to evaluate the effect of *Cajanus cajan* leaf meal in total mixed rations on the growth performance of West African dwarf growing rams fed *Panicum maximum*.

MATERIALS AND METHODS

EXPERIMENTAL SITE AND ANIMALS

The experiment was carried out at the Sheep and Goat Unit, Teaching and Research Farm, Oyo State College of Agriculture and Technology, Igboora. Sixteen (16) growing West African Dwarf rams weighing between 9.00 - 12.00kg and of 6 – 9 months of age were used. The animals were acclimatized for two weeks and treated against ectoparasites and endoparasites prior to the commencement of the experiment.

HARVESTING, PROCESSING AND PREPARATION OF EXPERIMENTAL DIETS

The forages were harvested from pasture demonstration plot of the college farm. *Cajanus cajan* leaves and *Panicum maximum* were cut at a height of 30cm above the ground level at 50% flowering stage to allow for good re-growth. *Cajanus cajan* leaves including twigs and petioles were harvested and air-dried to constant weight at room temperature while retaining their greenish colouration. The forage was then milled to pass through 2mm sieve. The CCLM were stored at room temperature in jute bags until needed for inclusion in the commercial supplement. Four experimental supplements were formulated by replacing a conventional supplement palm kernel cake (PKC), wheat offal, corn bran, bone meal, sheep premix and salt) with *Cajanus cajan* leaf meal (CCLM).

EXPERIMENTAL LAYOUT, DESIGN AND FEEDING METHOD

The animals were allocated by weight into four treatments of four rams per treatment and two animals as a replicate in a completely randomized design (CRD). The treatments consisted of four total mixed diets containing CCLM at 0, 5, 10 and 15% inclusion levels. The rams were fed on a basal diet of *Panicum maximum* in the morning (0800hr), while the experimental supplements were offered in the afternoon (1500hr). Each group of animals was assigned to an experimental diet and fresh clean water was made available.

DATA COLLECTION AND ANALYSIS

Adjustment period of one week was allowed before data collection commenced. At the beginning of the experiment, the rams were weighed and subsequently on a weekly basis prior to feeding in the morning. The initial live weight was subtracted from the final live weight to determine the weight gained by the animals. Feed offered and remnant (left over) were weighed daily to determine the feed intake of the animals. Both values were used to determine Feed conversion ratio, Dry Matter Intake (DMI), the mean initial body weight and weekly body weight were calculated. All growth performance data obtained were subjected to one-way analysis of variance (SAS 1999) mean value variance showing significant ($P < 0.05$) difference were separated using Duncan's multiple range test (Duncan 1955).

Table 1: Gross composition of experimental diets (%)

Ingredients	T ₁	T ₂	T ₃	T ₄
CCLM	0.00	5.00	10.00	15.00
Wheat offal	28.00	28.00	28.00	28.00
Corn bran	52.50	45.00	40.00	35.00
PKC	18.00	18.00	18.00	18.00
Bone meal	2.25	2.25	2.25	2.25
Salt	0.50	0.50	0.50	0.50
Premix	0.25	0.25	0.25	0.25
Total	100.00	100.00	100.00	100.00
Calculated Analysis				
CP	13.50	14.23	14.02	14.42
M.E (MJ/KgDM)	2659.66	2015.96	2011.26	2006.75

CCLM= *Cajanus cajan* leaf meal, PKC= Palm kernel cake, CP= Crude protein and ME= Metabolizable energy

Table 2: Chemical composition of the experimental diets and *Panicum maximum* (%)

Parameters	T ₁	T ₂	T ₃	T ₄	<i>Panicum maximum</i>
Dry matter	94.68	94.23	93.05	92.75	89.67
Crude protein	15.27	16.82	17.02	18.10	7.30
Crude fiber	8.75	9.12	9.86	10.16	22.20
Nitrogen free Extract	60.21	58.79	54.67	52.56	66.00
Ether extract	4.32	3.86	4.68	4.91	2.90
Ash	6.13	5.64	6.79	7.02	3.30

Table 3: Performance response of West African Dwarf growing rams fed *Cajanus cajan* leaf meal total mixed rations and *Panicum maximum* basal diet

Parameters	T ₁	T ₂	T ₃	T ₄	SEM
Average initial weight (kg)	10.91 ^d	11.46 ^b	11.55 ^c	11.64 ^a	0.14
Average final weight (kg)	11.52 ^d	11.91 ^c	12.12 ^b	12.50 ^a	0.12
Average weight gain (kg)	0.61 ^b	0.45 ^d	0.57 ^c	0.86 ^a	0.07
Daily weight gain (g/day)	10.89 ^b	8.04 ^d	10.18 ^c	15.36 ^a	1.33
Weekly weight gain (g/wk)	87.14 ^b	64.29 ^d	81.43 ^c	122.86 ^a	10.66
Concentrate Intake (g/day)	204.82 ^b	196.24 ^c	185.76 ^d	208.65 ^a	4.40
<i>Panicum max.</i> Intake (g/d)	130.91 ^b	134.68 ^a	127.85 ^d	129.78 ^c	1.25
Total DMI (g/head/d)	335.73 ^b	330.92 ^c	313.61 ^d	338.43 ^a	4.83
Feed Conversion Ratio	30.83 ^b	41.16 ^a	30.81 ^c	22.03 ^d	3.91

^{a b c d}Means on the same row with different superscript are significantly different ($P < 0.05$).

RESULTS AND DISCUSSION

The growth performance summary of the experimental rams was shown in Table 3. There were significant differences ($P < 0.05$) among the treatments in any of the parameters measured. The mean dry matter intake (DMI) values were between 313.61 – 338.43g/day, and these values were similar, meaning that the presence of the CCLM in the diets did not depress feed intake and that the diets containing the test ingredients were all accepted by the rams. Observed values were comparable with 334.94 – 365.97g/day reported by Sanwo *et al.* (2011) for goats fed melon husk and palm oil slurry at 30% inclusion level, but lower than 525.14 – 546.26g/day reported by (Oloche *et al.*, 2013) for WAD goats fed diets containing graded levels of sweet orange peel meal. There were significant ($P < 0.05$) differences in the mean daily weight gain and the feed conversion ratio which ranged from 8.04 – 15.36g/day and 22.03 – 41.16 respectively. The mean daily weight gain of the rams seemed to be slightly increases from T₂ – T₄ as the level of CCLM increased. Differences in the mean daily weights of the animals implies that the treatment diets with CCLM also provided adequate nutrients for the growth of the animals and these diets can be used for fattening of rams. Animals on T₄ diet (15% inclusion) had the highest average daily weight gain (15.36g/day) and the least (22.03) feed conversion ratio. These values are lower than the range of 35.72 – 64.29g/day reported by Ogunbosoye *et al.* (2016) for West African dwarf goats fed graded levels of shea nut (*Vitellaria paradoxa*) cake based rations. FCR seemed to improve from T₁ – T₄ as the level of CCLM increased in the diets. This showed that inclusion of test ingredients (CCLM) in the diets of the experimental animals had a positive impact on the feed conversion ratio. Observed values were higher than those values of Sanwo *et al.* (2011) who reported 11.59 – 17.24 for goats fed melon husk and palm oil slurry at 30% inclusion level.

CONCLUSION

From the result of the study, it can be concluded that *Cajanus cajan* leaf meal possesses adequate nutritive value to support good growth of West African Dwarf growing rams, especially during the period of drought and the forage can effectively serve as alternative feed ingredient in West African Dwarf growing rams diet.

RECOMMENDATION

Based on the result of this research, it could be recommended that *Cajanus cajan* leaf meal could be incorporated into the diet of WAD rams with inclusion level of up to 15% without any deleterious effect. Further research should be carried out using *Cajanus cajan* leaf meal at higher levels of inclusion in the diets of sheep and other livestock to substantiate its suitability and utilization by the animals.

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