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EFFECT OF VARYING LEVELS OF *Faidherbia albida* PODS SUPPLEMENT ON INTAKE AND WEIGHT GAIN OF RED SOKOTO GOATS IN THE SEMI ARID ZONE, NIGERIA

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ABSTRACT

The study was conducted to determine the intake and weight gain in goats fed varying levels of *Faidherbia albida* pods. Twenty goats weighing an average of 12.75 kg were used for the study. The animals were weighed and randomly allotted to four different treatments with varying level of *Faidherbia albida* pods as T_1 (10%), T_2 (20%), T_3 (30%) and T_4 (0%) in a completely randomized design (CRD) with five animals per treatment. The goats were supplemented with the experimental diet daily after the grazing hours which lasted for eight weeks. T_2 has the highest daily and weekly feed intake of 0.22 and 1.55±0.05 kg respectively which is significantly different ($P<0.05$) from the other treatments. Also T_2 recorded the highest daily and weekly weight gain of 0.09±0.01 and 0.65±0.12 kg respectively which is significantly different ($P<0.05$) from other treatments. There was no significant difference ($P<0.05$) between T_1 and T_3 as T_4 recorded the lowest in both feed intake and weight gain. The results of this study indicate that supplementing goats with 20% inclusion level of *Faidherbia albida* pods has significant effect on intake and weight gain of the animals.

Keywords: *Faidherbia albida,* Feed intake, Goats, Weight gain.

INTRODUCTION

Dry season feeding of livestock especially ruminants in the tropics has always been a problem to the farmers. At this time, the performances of these animals are seriously impaired. One possible way to alleviate this problem and maintain production in the tropics is to feed the ruminants with crop residues and browses which may serve as alternative feeds in the dry period. Incorporation of browse leaves into ruminant diets reduces total cost of production without a decrease in productivity or in efficiency of feed utilization. Browse plants have great potential as source of high quality nutrient for ruminants, being high in protein, minerals and vitamins (Babayemi *et al.*, 2003; Amodu and Otaru, 2004). They are available all year round because of their drought resistance, persistence, vigorous growth, re-growth and palatability (Crowder and Cheda, 1982). For this also the browse plants are found all year round in contrast to grasses which rapidly deteriorate with increasing fibre and decreasing protein. They also have higher nutritive value than grasses (Agishi, 1984). Vegetation available on non-arable land and crop residues from cereals and grain legumes are the most important feed resources available to farmers in the semi-arid zone of West Africa. Feed grains are not produced, and livestock receive grain only under exceptional situations. Farmers seldom cultivate forages. Grazing on non-arable land is seasonal and consists of unimproved species. Herbaceous legumes and other dicotyledons are important during the growing season but grasses are usually dominant. During the dry season, only senescent grasses and crop residues, both low in protein, energy, and minerals, remains in the

herb layer. In many areas they are completely grazed before the beginning of the next growing season. Browses from woody legumes are important livestock subsistence components of the vegetation. Agro-forestry with multipurpose trees (MPTS) that provide fodder could be integrated with the farming system as a way to improve livestock productivity (Torres, 1983). *Faidberbia albida* and other native trees are important in the agro-silvipastoral farming systems of semi-arid West Africa. These trees produce both leaves and fruits in the dry season which are used as feed for sheep, goats, cattle, and camels.

Livestock plays a role in the life of people on a global scale, chiefly as a source of income and in the provision of meat, milk and fibre in which the meat and milk are considered as the first class of protein source (Castillo-caamal *et al.,* 2003). In many developing countries, particularly those within arid and semi-arid regions of sub Saharan Africa, livestock production is affected by seasonal variation in the availability and quality of pasture (Castillo-caamal *et al.,* 2003). The effect of this on livestock production are obvious protein deficiency and depressed animal productivity especially during the dry season (Sawe *et al*., 1988). It is therefore imperative to supplement the animals during the dry season to meet the nutritional requirements of the animals.

Generally, goats need high quality feed and in most situations an optimum balance of many nutrients to achieve maximum production potentials (Lugingug and Poore, 2008). The study was therefore carried out to determine the effect of feeding varying levels of *Faidherbia albida pods* on weight gain and feed intake of Red Sokoto bucks.

MATERIALS AND METHOD

Experimental site

The experiment was conducted in the Small Ruminant section of the University of Maiduguri Teaching and Research farm located in Maiduguri, Borno state, Nigeria. Maiduguri is located on latitude $11^{o}5^{1}$N and longitude $13^{o}5^{1}$E and at about 354m above sea level. The area has a mean annual rainfall and temperature of about 650mm and 32ºC, respectively. Relative humidity ranges from 40-80% and is found to be higher from the month of June to September during the wet season and lower during the dry season (Aborisade and Robert, 2002). The area is characterized by sparse vegetation consisting mostly of browse plants and other thorny shrub (Ibrahim *et al*., 2016).

Animals and Experimental Design

Twenty Sokoto Red bucks aged 8 to 9 months weighing on average of 12.75 kg were used for the study. The animals were selected from the flock of animals kept at the Teaching and Research farm, tagged and randomly allocated to four treatments in a completely randomized design with five animals per replicate. The treatments (experimental diets) contained graded levels of *Faidherbia albida* pods at T_1 (10%), T_2 (20%), T_3 (30%) and T_4 (0%) inclusion levels (Table 1 and 2). The *Faidherbia albida* pods were collected from Jere Local Government Area of Borno state, sun-dried for two days, ground, packed and stored in bags for feeding trials.

Management of Experimental Animals

Twenty (20) Red Sokoto bucks with an average body weight of 12.75 kg were used. The bucks were randomly assigned to four (4) treatments balanced for weight with 5 animals per treatment in a completely randomized design. They were penned and given prophylactic treatment,

consisting of Ivermectin at 100 µg/kg body weight against endo- and ecto-parasites and Terramycin long acting (LA) antibiotics at 10 mg/kg body weight against bacterial diseases 7 days before the commencement of the experiment as reported by Abdu *et al*. (2015). Animals were allowed to graze in the morning and on returning they were offered weighed amount of experimental diets. Water and minerals salt were given ad-libitum. Early in the morning feed left over was collected and weighed and the differences recorded. Animals were weighed at the interval of seven days (one week) to determine weekly gain. Data collected were subjected to analysis of variance using completely randomized design (Steel and Torrie, 1980)

Table 1: Composition of the Experimental Diets

Ingredients (kg)	**T1**	**T2**	**T3**	**T4**
Faidherbia albida pods	10.00	20.00	30.00	0.00
Cowpea husk	30.00	25.00	20.00	40.00
Ground nut cake	10.00	10.00	10.00	10.00
Bone meal	5.00	5.00	5.00	5.00
Salt (Nacl)	1.00	1.00	1.00	1.00
Wheat offal	44.00	39.00	34.00	44.00
Total	**100.00kg**	**100.00kg**	**100.00kg**	**100.00kg**

Table 2: Proximate Analysis of Experimental Diets

Parameters	**T1**	**T2**	**T3**	**T4 (**Control**)**
Moisture	5.70	6.60	7.10	4.33
Dry matter	94.30	93.40	92.90	95.67
Crude protein	10.50	16.55	20.75	10.20
Crude fiber	20.50	24.50	22.50	20.33
Ash	1.50	2.50	2.50	1.34
Ether extract	1.50	2.50	2.00	1.33

RESULT AND DISCUSSION

Effect of graded levels of *Faidherbia albida* pods on feed intake of Red Sokoto bucks

Daily feed intake between the treatments increased up to 0.22 kg (Table 3) but decreased with additional inclusion of *Faidherbia albida* pods. This shows that an increase in level of *Faidherbia albida* pods above 20 kg decreased feed intake which is in line with the report of Mohammed (1989) and Abbator, (1996) that says an increase in level of *Faidherbia albida* pods above 20 kg in the diet decreases feed intake. T_2 recorded the highest feed intake (0.22 kg) which is significantly different ($P<0.5$) from other treatments. This may be attributed to the palatability and acceptability of the diet to the animals. This is also in contrast with the result reported by

Abbator, (1996) and Zarah, (1999), who reported that inclusion level of *Faidherbia albida* pods above 15 kg reduces feed intake of Red Sokoto bucks.

Table 3: **Effect of graded levels of *Faidherbia albida* pods on feed intake of Red Sokoto bucks**

	Dietary treatments			
Parameters	**T1**	**T2**	**T3**	**T4(**control**)**
Daily feed intake(kg)	0.20±0.00^{ab}	0.22±0.00^{a}	0.20±0.00^{ab}	0.17±0.00^{b}
Weekly feed intake (kg)	1.43±0.04^{ab}	1.55±0.05^{a}	1.42±0.05^{b}	0.28±0.00^{c}
Feed to gain (kg)	2.95±0.68^{a}	3.15±0.53^{a}	2.13±0.53^{b}	0.00±0.00^{b}

^{abc}Means with the same superscript along rows are significantly different (P<0.5)

Weekly feed intake recorded in T_2 (1.55±0.05) was significantly different (P<0.5) to that of T_3 (1.42±0.05) and T_4 (1.36±0.05). The lower intake recorded in T3 and T4 may be due to high level of *Faidherbia albida* pods which may contain high anti-nutritional factors and low palatability of the diet respectively. Zarah, (1999) also attributed low palatability with increased inclusion of tannin containing feed.

Effect of graded levels of *Faidherbia albida* pods on weight gain of Red Sokoto bucks

Red Sokoto bucks fed T_2 recorded the highest daily weight gain (0.09±0.01) which is significantly different (P<0.5) compared to the other treatments (Table 4). Daily weight gain of T_1 and T_3 (0.07±0.01 and 0.07±0.01) are similar (P>0.5) but significantly different from T_4 which recorded the lowest weight gain per day (0.03±0.00). These differences may be attributed to higher fibre accumulation as the level of *Faidherbia albida* pods increases and constantly low digestibility. This finding partly agree with the report of Zarah, (1999), who reported that increase in level of *Faidherbia albida* pods in the diet above 150 g decreases weight gain.

The result of weekly weight gain of red Sokoto bucks fed varying levels of *Faidherbia albida* pods shows significant difference (P<0.5). The weekly weight gain of bucks fed with 20% (T_2) inclusion level of *Faidherbia albida* pods was significantly higher (P<0.5) as compared to other treatments which may be attributed to high protein content of the diet as reported by Mohammed, (1989). Weekly weight gain of bucks fed T_1 and T_3 was similar statistically with T_4 recording the lowest weight gain per week. The lower value of 0.55±0.10 recorded in T_3 may be attributed to increase in inclusion level of *Faidherbia albida* pods which contain high tannin which bind protein and inhibit its utilization. This is in agreement with the work of Mc'Naughton, (1987) who reported that condensed tannins are not degraded and therefore form complexes with protein resulting in decreased feed intake, digestibility and subsequently affect weight gain. The results of this study indicate that supplementing goats with 20% inclusion level of *Faidherbia albida* pods has significant effect on intake and weight gain of the animals.

Table 4: Effect of graded levels of *Faidherbia albida* pods on weight gain of Red Sokoto bucks

	Dietary treatments			
Parameters	**T_1**	**T_2**	**T_3**	**T_4**
Daily weight gain (kg)	0.07 ± 0.01^{ab}	0.09 ± 0.01^{a}	0.07 ± 0.01^{ab}	0.03 ± 0.00^{b}
Weekly weight gain (kg)	0.53 ± 0.01^{ab}	0.65 ± 0.12^{a}	0.55 ± 0.10^{a}	0.24 ± 0.04^{b}
Total weight gain (kg)	13.29 ± 0.50^{a}	13.86 ± 0.53^{a}	13.61 ± 0.41^{a}	12.88 ± 0.19^{a}

[ab]Means with the same superscript along rows are significantly different (P<0.5)

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