

EFFECT OF VARIED INCLUSION LEVELS OF *Parkia biglobosa* pulp IN RED SOKOTO BUCKS ON INTAKE, DIGESTIBILITY AND NITROGEN BALANCE

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ABSTRACT

The work was carried out to study the intake and nutrient digestibility in Red Sokoto bucks fed graded levels of *Parkia biglobosa* pulp in a complete diet. 16 Red Sokoto bucks average weight 13.40kg $\pm$ 2 were randomly assigned into four groups with four bucks per group in a completely randomized design. Involving four dieting treatments T1, T2, T3 and T4 containing 0, 10, 20 and 30% levels of inclusion of *Parkia biglobosa* pulp. The proximate composition of the *Parkia biglobosa* pulp showed that the *Parkia biglobosa* pulp had 6.86, 11.98 and 64.16% of CF, CP and NFE respectively. The animals fed 20% *Parkia biglobosa* pulp had highest intake of almost the nutrients. The result indicated that the apparent digestibility of Dry matter (66.19%), crude protein (64.03%) and NFE (64.69%) was high ($p < 0.05$) in animals fed 10% *Parkia biglobosa* pulp and had the best digestibility of almost all the nutrients. The highest Nitrogen retained as per cent of nitrogen intake 61.68% was obtained in animals fed 10% *Parkia biglobosa* pulp. It was concluded that DM intake, nutrient digestibility and nitrogen utilization of bucks can be enhanced by including 10% of *Parkia biglobosa* pulp in their diets.

Key words: *Parkia biglobosa*, pulp, Wheat offal, Red Sokoto bucks and Maize cob

INTRODUCTION

The scarcity of energy and protein feedstuffs during the dry season is a major set-back to ruminant livestock production in Nigeria. This results in a marked decrease in voluntary intake and digestibility (Smith, 2001). The prices of conventional energy ingredients have raise in addition to increased competition between humans and animals as a result of increased human population. Whereas, the high cost of Maize and other conventional feed resources in Nigeria had led to high cost of animal feed which in turn has prompted the need to explore the use of unconventional feed resources as alternatives or replacement for the convention feed ingredients.

The Locust bean pulp known as “Dozim” in English, “Dorowa” in Hausa and “Igba” in Yoruba. is obtained from the locust bean seed (*Parkia biglobosa*), which belongs to the family leguminosae. Its Attractive yellow colour indicates the presence of phyto-nutrients possibly carotenoids, which are important precursors of retinol (vitamin A), which is known to improve appetite and consequently the growth performance in livestock (Lin *et al.*, 2002). Although the yellow fruit pulp does not attract much attention like the locust beans, the embedded yellow pulp of the fruits” is a potential source of energy because of the high carbohydrate content. The yellow-pulp has been reported to be edible and non-toxic. The objectives of this study were to evaluate the intake, digestibility and nitrogen balance in Red Sokoto bucks fed in a complete diet.

MATERIALS AND METHODS

The experiment was conducted at the Department of Animal Science Farm, Ahmadu Bello University Zaria. *Parkia biglobosa* pulp was obtained from, Jaba local Government Area Kaduna state. Other feed ingredients which include cotton seed cake, wheat offal, bone meal and common salt were purchased from Rebson feeds Samuru, Zaria.

Sixteen Red Sokoto bucks of average weight 13.40kg $\pm$ 2 were used to study feed intake, digestibility and N balance and were obtained from the Department of Animal Science Farm. The animals were dewormed and dipped in ascaride solution. The diet constituted wheat offal, maize cob, cotton seed cake, common salt, bone meal plus *Parkia biglobosa* pulp at various levels 0%, 10%, 20% and 30% for treatment T1, T2, T3 and T4 respectively.

Digestibility and Nitrogen balance studies were carried out using 16 Red Sokoto bucks average weight 13.40kg $\pm$ 2 were randomly assigned into four groups in a completely randomized design. Last

for 21 days in which 14 days were for adaptation, 7 days for Data Collection. The animals were weighed and housed in metabolism cages with free access to feed and clean water supplied *ad libitum*. The diets were offered to the animals daily at 0800hr. 3% of their body weight. Chemical composition of the dried feed and faeces samples were analyzed according to AOAC (2001). Data collected during the digestibility trials were subjected to one-way ANOVA SAS (2002) to evaluate for significant difference among treatment means. Duncan multiple range tests (DMRT) was used to compare treatment means (Duncan, 1955).

RESULTS AND DISCUSSION

Chemical Composition and Nutrients Intake

Table 1 shows the proximate composition of *Parkia biglobosa* pulp used in the study. The *Parkia biglobosa* pulp had dry matter (88.62%), crude protein (11.97%), crude fiber (6.86%), Ether extract (2.10%), Ash (3.56%) and NFE (64.14%). the crude fibre reported in this study was lower than 9.61% reported by Edigwe *et al.*, (2012) while the crude protein of 11.94% was similar to the value reported by Bot *et al.* (2013) of 11.52%. The fat content of the *Parkia biglobosa* pulp of this experiment was within the range reported of 1.80 to 2.965 (; Garneh *et al.*, 2007). **Table 1: Proximate composition of *Parkia biglobosa* pulp**

Parameters	Percentages
Dry matter	88.62
Crude protein	11.94
Crude fiber	6.86
Ether extract	2.10
Ash	3.56
Nitrogen Free Extract	64.16

Table 2 shows the effects of *Parkia biglobosa* pulp on feed and nutrients intake of Red sokoto bucks. The result showed that nutrient intake across the treatment differed significantly ($p < 0.05$). T4 inclusion level of *Parkia biglobosa* pulp had the highest total feed intake (335.74g/d), The sweet taste of the *Parkia biglobosa* pulp is an indication of the presence of natural sugar and thus, a potential source of energy that is readily digested and absorbed more than complex carbohydrate (Bot *et al.*; 2013).

Table 2: Effect of *Parkia biglobosa* pulp inclusion levels on nutrient intake in Red Sokoto bucks

Parameter	Levels of inclusion of <i>Parkia biglobosa</i> pulp (%)				SEM
	T1 (0%)	T2 (10%)	T3 (20%)	T4 (30%)	
Feed Intake	325.24 ^b	331.74 ^a	328.04 ^a	335.74 ^a	5.26
Dry Matter	234.85 ^c	243.73 ^{ab}	245.17 ^a	241.58 ^b	8.08
Organic Matter	219.11 ^c	228.70 ^a	228.87 ^a	227.23 ^b	7.57
Crude Protein	27.52 ^c	32.43 ^a	30.57 ^a	28.56 ^b	0.98
Crude Fibre	31.99 ^b	38.33 ^a	41.30 ^a	38.81 ^a	1.48
Ether Extract	14.77 ^b	31.18 ^a	10.65 ^c	11.08 ^c	5.08
ASH	15.74 ^a	15.03 ^b	16.30 ^a	14.80 ^b	0.48
N Free Extract	121.78 ^c	147.45 ^a	146.34 ^{ab}	142.38 ^b	5.12

^{abcd} Mean values with different superscripts within the row differed significantly ($P < 0.05$),

SEM = Standard error of mean. NFE: Nitrogen free extract.

Nutrient Digestibility and Nitrogen Utilization

The results of nutrient digestibility of Red Sokoto bucks fed diets containing different level of *Parkia biglobosa* pulp are presented in Table 3. The result showed that the nutrient digestibility across the treatment differed significantly ($p < 0.05$). The Dry matter digestibility values obtained in T2 and T3 (66% and 64%) were indicated as highest digestible levels and statistically similar ($p > 0.05$), the lowest digestibility coefficient recorded in animals fed 30% level of inclusion maybe attributed to the present of tannin which was reported a *Parkia* fruit pulp contained 81.00mg/100g (Gernah *et al.*, 2007). Tannins have been known to cause decreased feed consumption in animals, bind dietary protein and digestive enzymes to form complexes that are not readily digestible

Table 3: Effect of *Parkia biglobosa* pulp inclusion levels on nutrient digestibility in growing Red Sokoto bucks

Parameters	Levels of inclusion of <i>Parkia biglobosa</i> pulp (%)				
	(0%)	(10%)	(20%)	(30%)	SEM
Dry Matter	60.27 ^b	66.19 ^a	64.14 ^{ab}	55.44 ^c	0.96
Organic Matter	60.96 ^b	65.31 ^a	66.78 ^a	56.25 ^c	1.00
Crude protein	51.04 ^c	64.03 ^a	60.29 ^b	40.81 ^d	1.11
Crude fiber	27.95 ^c	45.29 ^b	50.78 ^a	46.90 ^{ab}	1.79
Ether extract	93.41 ^a	91.39 ^{ab}	86.77 ^b	80.56 ^c	0.81
NFE	51.73 ^b	64.69 ^a	62.25 ^a	51.16 ^c	1.29

^{abcd} Mean values with different superscripts within the row differed significantly (P<0.05), SEM = Standard error of mean. NFE: Nitrogen free extract.

The result of nitrogen utilization of Red sokoto bucks fed diets containing different levels of *Parkia biglobosa* pulp are presented in Table 4. The result indicated that nitrogen utilization across the treatment differed significantly (p<0.05). The nitrogen loss in faeces was significantly higher in T4 (16.90g). This showed that the animals fed with T4 did not efficiently utilize the Nitrogen in their body, rather they passed it out through their faeces. The very high fecal N in T4 indicated tannin activity resulting in dietary N being excreted in the feces as tannin-protein complexes.

Table 4: Effects of *Parkia biglobosa* pulp inclusion levels on nitrogen balance in growing Red Sokoto bucks

Parameters	Levels of inclusion of <i>Parkia biglobosa</i> pulp (%)				SEM
	T1 (0%)	T2 (10%)	T3 (20%)	T4 (30%)	
N Intake	27.52 ^c	32.44 ^a	30.57 ^{ab}	28.46 ^b	0.80
N Loss in Faeces	13.62 ^b	11.88 ^c	12.06 ^c	16.90 ^a	0.57
N Loss in Urine	0.65 ^b	0.77 ^{ab}	0.88 ^a	0.60 ^c	0.07
Total N Loss	14.27 ^b	12.65 ^c	12.93 ^c	17.50 ^a	0.59
N Absorbed	13.91 ^c	20.56 ^a	18.52 ^b	11.56 ^d	0.51
N Balance	13.25 ^c	19.79 ^a	17.64 ^b	10.96 ^d	0.52
% N Intake	48.71 ^c	61.64 ^a	57.44 ^b	38.69 ^d	1.16

^{abcd} Mean values with different superscripts within the row differed significantly (P<0.05), N = Nitrogen SEM = Standard error of mean

CONCLUSION

Based on the results of this study, it was concluded that the inclusion of 10% *Parkia biglobosa* pulp in a complete diet for a growing Red Sokoto buck can increase daily Dry matter intake and also boost the digestibility of Dry matter, Organic matter, Crude protein and Nitrogen free extract.

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