FEEDING POTENTIAL OF *FAIDHERBIA ALBIDA* RIPE PODS FOR SUDAN DESERT GOATS

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Abstract

This study was conducted to assess the nutritive value of *F.albida (*Haraz) as a fodder tree. A total of 28 entire,6-8 months Sudan desert male goat kids were used for the study . The kids were randomly allocated in groups of seven to four diets containing 0.00,15,30 and 45% dry *F.albida* pods designated treatment 1(control),2,3 and 4. The diets were offered in a pelleted form ad libitum in a 12 weeks feeding trial. Eight kids (two from each group) were utilized for the digestibility trial immediately after the termination of the feeding trial .

Average daily liveweight gain tended but non significantly (P.>0.05) to increase in diets based on palatable *F.albida* pods. Significant differences ($p<0.05$) were observed among dietary treatment regarding average daily feed consumption (kg) and feed conversion ratios The values of these parameters were 0.92,31.72; 1.05, 19.44;1.02, 23.18; 1.03 ,25.9 for kids in control compared to treatments 2, 3 or 4 respectively.

The total digestible nutrient (%) and digestible protein (kg\kg dry matter) values for diet 1, 2, 3, and 4 were found to be 76,.0.18; 69,0.14; 66,0.18;72, 0.17 respectively. No symptoms of ill health were noted among the experimental animals throughout the feeding trial .

Introduction

Unlike temperate tropical pastures, are known for their rapid deterioration in their nutritive quality. Protein rather than energy tends to be the most limiting nutrient. Fodder trees and shrubs maintain a consistent high level of nitrogen throughout the year with a crude protein content of over threshold level (7.00%CP) for optimum dry mater intake(Butterworth, 1985). Ruminant in the arid and semi-arid areas of Sudan subsist almost

entirely on drought tolerant pasture species and supplement their nutrient requirement generally from the available fodder trees and shrubs.

Faidherbia albida tree is particularly a note-worthy among the deciduous leguminous fodder trees of the Sudan.The tree has relatively wide ecological amplitude and unique nature of bearing leaves and flowers during the dry season and shedding leaves during the rainy season(Osman and El Atta, 1993). Owing to this phenology, the tree provides abundant pods and green fodder for nourishing animals during period of feed scarcity. Animals are reported to (Storrs, 1977) to eat the pods which contain an average 12,40% crude protein and 42.65 nitrogen free extract(Wilson, 1963). It has been estimated (Jung, 1967: Wickens, 1969; Delwaulle, 1977) that the mature tree of *F.albida* could produce 135 kg of pods with average value twice that of good hay or dried peanut. There is however, a paucity of information on the extent to which *F.albida* pods can be utilized by goats and other animals. With this background in mind, this study was planed to evaluate the feeding potential of the ripe pods of *F.albida* using Sudan desert goats.

MATERIALS AND METHODS

Animals and their managements:

Thirty entire male kids of desert type were purchased from El Dien town (about one thousand kilometers west of Khartoum) for the feeding and digestibility trials. They ranged in age between 6-8 months and the average live-weight was 18.5 kg. They arrived in trucks to the experimental site in Soba, Central Veterinary Research Laboratory, the kids were rested and identified with ear tags . They were allowed standardization period of three weeks during which they were fed Abu sabein (Sorghum bicolor) and treated with broad spectrum anthelmintic. The animals were housed in pens with concrete floor and roof. The pens were equipped with adequate watering and feeding facilities .

Deits preparation :

F.albida ripe dry pods were brought from Wadi Al Hamadi in North Kordofan State. The experimental diets were formulated to contain 0.00,15,30 and 45% *F.albida* ripe pods designated treatment 1, 2, 3 and 4 respectively. The pods and other ingredients (Table,1) were mechanically

ground (2mm screen) and mixed throughly to ensure uniform blending and pelletting.

Allocation of animals to treatments:

At the end of the standardization period, 28 of the animals were weighed in a walk-in balance(150 kg maximum load) and divided into four similar groups of seven animals each according to age and weight. Each group was assigned randomly to one of the four dietary treatments. Animals within each group were separately penned and fed as outlined. Each pen was provided with watering and feeding facilities. Animals in each group were fed collectively the respective diet throughout the 12th week experiment period. The experimental diets were introduced gradually to the kids and adlib feeding level took place after one week,and was thereafter maintained to the end of the experiment.

All the kids were weighed at the beginning of the experiment and weekly thereafter. Daily water and feed intake were recorded and food was withheld from the animals 12 hours before weighing. At the end of the feeding trial, two kids from each treatment were randomly taken for further evaluation of the experimental diets. To assess the nutritive value of the diets to which they were adapted, digestibility trials (4X4 Latin square method) were conducted using metabolic crates. Samples of feed offers, feed refusals, faeces and urine were collected daily for 7 days, with 5 days switch off, and properly preserved and stored. At the end of the trial, proximate analysis were carried-out on the composite samples for each feed, refusals, faeces and urine according to (A.O.A.C., 1990) methods.

Analysis of variance (Snedechor and Cochran, 1967) was performed to study treatment effects on feed intake, liveweight gain feed conversion ratios (total weekly feed intake for each group\total weekly gain). Duncan multiple range test was used to compare means.

RESULTS

Ingredient and proximate composition of the formulated diets are shown in Table 1. It was designed that percent composition of the experimental diets be fixed and varies only with regard to *F.albida* and Sorghum grains. Graded levels of the former has quantitatively replaced the latter. Proximate composition of the four treatment diets indicate that crude protein was fairy adequate and similar to the recommendation of (A.R.C., 1980) of 0.20-0.38g CP\g gain.

Dry matter intake, liveweight gain and feed conversion ratios are presented in Table 2. Mean daily feed intake and feed conversion ratios were significantly improved with incorporation *F.albida* pods. Liveweight gain also improved, but non significantly, with incorporation of *F.albida* pods being highest with treatment 2 and least with treatment 4.

Average daily live weight gain tended to decrease with increase level of *F.albida*. As a result animals gained 54,44 and 39 grams in treatment 2,3 and 4 respectively, while the kids in the control gained 29g\day. Intakes were higher for kids fed diets based on *F.albida* pods and lower for kids in the control group (Table,2). Feed conversion ratios (feed\gain) was significant ($P<0.05$) among the treatment groups indicating that incorporation of *F.albida* improves palatability of Sorghum based diets for ruminants. Feeding of *F.albida* pods up to 45% of the total intake produce no adverse effects on feed intake or body weight gain..

Figures 1 and 2 illustrate the growth curves and dry matter intake of groups fed the treatment diets throughout the 12 weeks experimental period. Liveweight gain increased consistently with the increase in the feeding period up to the end of it.

Discussion

In the present study kids on various diets consumed 0.92, 1.05, 1.02 and 1.01kg feed \head\day for treatment 1, 2, 3 and 4 respectively. The average feed intake of kids fed various levels of *F.albida* pods was significantly higher ($P<0.05$) than that of kids fed the control Sorghum diet. This is consistant with finding of (N.R.C., 1984) which postulated that animals of high feed intake grow at a faster rate than those which fed less. Consequently, kids fed different levels of *F.albida* were more efficient in

converting feed to body tissues. This was in agreement with finding of El Amin et al(1990) for desert goat kids receiving diets containing of low, medium and high concentrates . The average dry matter intake pattern reported in this study was comparable to that of White Boran goat receiving rations containing 0.00, 20, 40 and 60% F,albida pods (Ibeawuchi and Adamu, 1990). The observed values for dry matter intake are adequate for the weight of the kids used and indicate good acceptance of the experimental diets The observed differences among diets in crude protein intake were largely related to differences in crude protein and dry matter intake.

The rates of liveweight of kids used in this study substantiate similar finding reported by Devendra, 1977; Babiker and Tibin, 1985; El Amin et al.1990; Ibeawuchi and Adamu, 1990.The slow rate of growth observed in this study may be attributed to variety of factors including poor genetic make-up, extra energy expenditure associated with inherent excessive goat kids activity and relatively high maintenance requirements (McDowel and Bove, 1977)., inadaptability of goats to husbandry in confinement and the inclination of goats to browse rather than to hand feeding in a feedlot system. The high feed conversion ratios in this study was in harmony with similar results reported by McDowel and Bove (1977); Robstad, (1977) and El Sayed (1981). However, incorporation of *F.albida* pods in the diets improved the ability of the kids to convert feeds into body tissues.

The decrease in daily liveweight gainas the level of of *F.albida* pods increased to 45% could partly be due to the decreased efficiency of feed utilization rather than the reduced feed intake alone. This is in conformity with finding of Ibeawuchi and Adamu(1990). Values of total digestible nutrients and digestible protein in all diets indicated that the four diets had high nutritive value for the male goat kids. Similar conclusion has been reported by(Ibeawuchi and Adamu, 1990).

It was concluded that incorporation of *F.albida* pods up to 45% had no adverse effects on kids performance and nutrient digestion.

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Table 1

percentage and proximate composition of experimental diets

Ingredients %	Experimental diets			
	1	2	3	4
F. albida dry pods	0.00	15	30	45
Sorghum vulgarie	45	30	15	0.00
Ground-nut cake	20	20	20	20
Ground-nut hulls	23	23	23	23
Molasses	10	10	10	10
Mineral-vitamin mix	2	2	2	2
Proximate composition (%) dry matter basis				
Dry matter	97.40	97.10	97.00	97.50
Crude protein	97.40	97.10	97.00	97.50
Crude fibre	20.98	23.83	26.80	29.63
Ether-extract	3.70	3.09	3.61	3.69
Ash	3.30	3.51	3.66	3.38
Nitrogen-free extract	45.42	49.68	49.79	48.56
ME. MJ\kg DM	11.52	11.49	11.88	11.79

Each value is the mean of two analyses

Table 2

Feedlot performance of male desert goat kids

Item	Diet				
	1	2	3	4	SE.
Animals number	7	7	7	7	--
Weeks on feed	12	12	12	12	--
Initial live weight (kg)	18.47a	18.63a	18.53a	18.60a	0.77 NS
Final live weight (kg)	20.72a	22.77a	21.96a	21.61a	0.72 NS
Total gain (kg)	2.42a	4.53a	3.70a	3.26a	0.72 NS
Live weight gain kg\day	0.029a	0.054a	0.044a	0.039a	0.50 NS
Feed conversion ratio	31.72b	19.44a	23.18a	25.90a	0.77**
Dry matter intake kg\day	0.62b	1.05a	1.02a	1.01a	0.49*
Digestible Crude protein (kg)	0.112	0.085	0.136	0.076	--
Nitrogen retained g\day	5.27	3.30	6.62	0.60	2.12 NS
Total digestible nutrient %	76.16	69.15	66.14	72.11	--

NS Not significant P<0.05
* Significant difference P<0.05
** significant difference P<0.01
Means in a row followed by the same letter or no letter do not differ Significantly P>0.05

الأثر الغذائي لثمار أشجار الحراز عند إستخدامها في تغذية الماعز الصحراوي السوداني

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الملخص :

أجريت هذه التجربة لمعرفة الأثر الغذائي لثمار أشجار الحراز البقولية . إستعمل عدد ٢٨ رأساً (٦ -٨ شهور) من الجديان الصحراوية السودانية في التجربة الغذائية والتي استمرت لمدة ١٢ أسبوعاً . قسمت الحيوانات لأربعة مجموعات متساوية العدد ومتقاربة الأوزان . أعلفت الحيوانات بمكعبات(Pellet)العلف المركبة من نسب مختلفة من ثمار أشجار الحراز ومكونات علفية أخرى . قدم العلف للحيوانات على أساس الإستهلاك الطوعي الحر ، علف المجموعة الأولى خالي من ثمار أشجار الحراز بينما كانت نسب ثمار أشجار الحراز في المجوعات الثانية ، الثالثة والرابعة ٤٥، ٣٠، ١٥ على التوالي .

إزداد معدل النمو اليومي ولكن دون فروق معنوية (P>.05) في العلائق التي احتوت على ثمار أشجار الحراز ذات الاستساغة بينما طهرت فروق معنوية في معدل إستهلاك العلف "كجم" وكفاءة التحويل الغذائي حيث كانتا في المجموعات الأولى ، والثانية ، الثالثة ، الرابعة على التوالي كالآتي : ٠,٩٢ ، ٣١,٢٣ ؛ ١,٠٥ ، ١٩,٤٤؛ ١,٠٢ ، ٢٣,١٨؛ ١,٠٣ ، ٢٥,٩ .

مجموع المركبات الغذائية "٪" والبروتين المهضوم(كجم/كجم مادة جافة) للمجموعات الأولى والثانية والثالثة والرابعة كانت : ٧٦ ، ١٨، ٠؛ ٦٩، ١٤،؛ ٦٦، ١٨، ٠؛ ٧٢ ، ١٧، ٠على التوالي .

لم تظهر أعراض مرضية على حيوانات التجارب طوال فترة التجربة مما يستخلص منه إمكانية إستخدام ثمار أشجار الحراز حتى نسبة ٤٥٪ في العليقة ليس لحفظ مياه حياة الحيوان فحسب بل لزيادة النمو والإنتاج .