

THE UTILIZATION OF COMPLETE DIETS CONTAINING SOYABEAN HAULMS BY GOATS

I.F. ADU* AND C.U. OSUHOR

National Animal Production Research Institute
Shika - Zaria

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ABSTRACT

Sixteen Yearling Red Sokoto goats were used to determine the effect of complete diet feeding on intake and nutrient utilization of diets based on soyabean haulm. Three diets in which soyabean haulm constituted 40, 50 and 60% of the mixture were compared with a control diet in which soyabean haulm was offered separately but supplemented with a concentrate mixture. Total feed intake, liveweight gain and feed efficiency were significantly (P<0.05) better in goats fed complete diets particularly at the 40 and 50 levels of soyabean haulm inclusion. The results of the study showed that the utilization of soyabean haulm can be further enhanced by mixing it with other concentrate feeds.

Key words: complete diets, soybean haulms, feed utilization, goats.

INTRODUCTION

Many methods have been used to increase the contribution of low quality roughages to the overall nutrition of ruminants. Chopping and/or grinding are mechanical processes which not only increase intake but also enhance the incorporation of such feeds in complete diets. The inclusion of chopped straw in complete diets resulted in better utilization of such straws (Kaufmann, 1976; Greenhalgh *et al*, 1986). An earlier study with soyabean haulms fed as separate diet (Adu *et al*, 1986) showed that soyabean haulm gave fairly good intake and liveweight response in goats. Not much has been reported on the use of complete diets in Nigeria. This experiment is therefore to further seek the contribution on soyabean haulm to goat

feeding when fed as complete diet.

MATERIALS AND METHODS

The M216 soyabean variety used in this study has been described by Adu *et al* (1986). Three complete diets consisting of 40, 50 and 60% soyabean haulm were offered to 3 groups of Red Sokoto goats aged about 18 months and weighing between 14 and 16kg. A control group was fed soyabean haulm separately in addition to some concentrate.

The details of the diets fed are shown in Table 1. For the control (Treatment A) group animals, the soyabean haulm was chopped into 20 to 40mm lengths and fed separately while it was chopped and ground (2mm screen) and mixed with other concentrate feeds for the complete diets. The molasses to 2 parts by weight of water to facilitate uniform mixing of all ration ingredients. Sixteen goats were randomly assigned to each of the 4 diet group. Animals were fed the diets at rates that allow for about 15% refusal and had access to water throughout the 72-day trial period. A 7-day metabolism study was conducted with 12 goats immediately after the feeding trial. During the study, faecal output from each animal was weighed and their dry matter was determined daily. A 10% representative sample of the dried faeces for each of the 7-day period was bulked and frozen. Urine output volume was also measured daily in plastic containers containing HCL. A 50% aliquot was collected and bulked for each of the 7-day period and frozen at -50°C. Samples of feed, faeces and urine were analysed for proximate constituents by the methods of A.O.A.C. (1975), while

* Present Address: University of Agriculture, P. M. B. 2240, Abeokuta, Nigeria.

TABLE 1 COMPOSITION OF EXPERIMENTAL DIET

Ingredients (%)	Treatments				
	A	B	C	D	
Soyabean haulm	-	40	50	60	
Cotton Seed Cake	35	20	15	10	
Wheat Offal	40	15	10	5	
Molasses	12	12	12	12	
Water	8	8	8	8	
Bone meal	3	3	3	3	
Sodium chloride	22	2	2	2	
Chemical Composition (% Dry Matter Basis)					Soyabean haulm.
Dry matter	78.1	77.4	76.9	77.2	94.3
Crude protein	12.6	11.7	11.5	11.1	7.1
Crude fibre	6.2	27.2	29.1	31.6	48.8
Gross energy (MJ/kg)	14.6	17.4	16.3	15.1	13.2

+ Treatment A animals were also fed soyabean haulm but separately.

gross energy was determined by adiabatic bomb calorimetry. Data were analysed statistically as a completely randomised design (Snedecor and Cochran, 1976).

RESULTS AND DISCUSSION

The chemical composition of the diets offered is shown in Table 1. The crude protein and crude fibre contents of soyabean haulm were 7.1 and 48.8 percent respectively.

Table 2 shows the intake, liveweight gain and nutrient digestibility coefficients of the diets. The complete diet method of feeding significantly (P<0.05) increased dry matter intake of the goats especially treatments B and C intakes which showed higher figures

compared to treatments A and D. The complete method of feeding resulted in higher digestibility coefficients. The coefficients however decreased as the amount of soyabean haulm increased in the diet. These results agree with those of Holter *et al* (1977), Larkin and Fosgate (1970) and Kaufmann (1976) who observed that complete diet feeding encouraged controlled rumen fermentation needed to enhance a better utilization of a diet.

Water intake was generally higher in animals on complete diet than in animals fed the haulm and concentrate separately. This is contrary to the expectation that water intake should be higher in animals on the more

Water intake was generally higher in animals on complete diet than in animals fed the haulm and concentrate separately. This is contrary to the expectation that water intake should be higher in animals on the more

fibrous diet. The total crude in treatments B to D. Within the complete diet groups, water intake increased with increase in the level of

treatments B and C where soyabean haulm constituted 40 to 50 percent of the diet respectively. The general decline in the

TABLE 2 DRY MATTER INTAKE LIVELWEIGHT GAIN AND DIGESTIBILITY COEFFICIENTS OF SOYABEAN HAULM BASED DIETS

	Treatments				Soyabean haulm
	A	B	C	D	
Haulm intake as separate feed, g/day	192.6	-	-	-	
Concentrate intake, g/day	331.2	576.3	561.6	515.8	
Total intake, g/kg W.75/day	72.1 ^a	81.9 ^b	78.5 ^b	71.8 ^a	
Water intake, l/kg DM I	2.4 ^a	2.6 ^a	2.7 ^a	3.1 ^b	
Liveweight gain, g/day	58.2 ^a	76.1 ^b	79.8 ^c	63.4 ^d	
Feed to gain ratio	9.03	7.6	7.9	8.1	
Digestibility Coefficients, %					
Dry matter	60.1 ^a	66.6 ^b	64.1 ^b	62.8 ^a	42.3
Organic matter	59.1	62.4	61.7	60.2	46.8
Crude fibre	53.8	58.2	56.9	53.6	34.1

a,b Means on the same row with different superscripts are significantly ($P < 0.05$) different.

soyabean haulm inclusion.

Similar results were reported by Meang *et al* (1971). Liveweight gains of goats were generally high and the increase due to the method of feeding was significant ($P < 0.05$).

The utilization of energy and nitrogen in the diets are shown in Table 3. There were significant differences in the amount of nitrogen and energy intake as well as the amount of these nutrients retained. The results were more striking for animals on

response of animals on treatment D where soyabean haulm constituted 60% of the diet can be attributed to the lower crude protein and higher crude fibre contents of the diet and hence its lower digestibility coefficients. The results suggest that soyabean haulm should make up 40 to 50% of a complete diet for best results.

For complete diets to be acceptable in practical feeding by the local farmers, it must be easy to compound. Given the present

situation in Nigeria, logistical problems associated with collection and transportation as well as inadequate processing facilities may constrain the effective and efficient use of soyabean haulm and crop residues in general.

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TABLE 3 UTILIZATION OF NITROGEN AND ENERGY OF SOYABEAN HAULM BASED DIETS

	Treatments			
	A	B	C	D
Partition of nitrogen, g/day				
Nitrogen intake	8.78 ^a	10.79 ^b	10.33 ^b	9.16 ^a
Faecal nitrogen loss	2.16	2.67	3.01	3.18
Urinary nitrogen loss	2.71	3.02	2.63	2.89
Nitrogen retained	3.91 ^a	5.10 ^b	4.69 ^b	3.09 ^a
Nitrogen retained (% of intake)	44.5	47.3	45.4	33.7
Partition of energy MJ/day				
Energy intake	8.22	10.03	9.15	8.79
Faecal energy loss	3.17	2.67	2.84	2.32
Urinary energy loss	1.66	3.09	2.42	2.83
Energy retained	2.39 ⁺	4.27 ^b	3.89 ^b	3.64 ^d
Energy retained (% of intake)	29.1 ^a	42.6 ^b	42.5 ^b	33.7 ^d
Protein efficiency ratio +	6.6	7.1	6.9	6.9

a, b Means on the same row with different superscript differ significantly (P < 0.05).

+ Protein efficiency ratio = Body weight gain per nitrogen intake.

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