

# A NOTE ON CORN COBS IN SHEEP DIET

J.A. ALOKAN

*Department of Animal Science  
University of Ibadan, Ibadan  
Nigeria.*

(Received

## ABSTRACT

Twelve West African dwarf lambs 11 to 15 months of age and weighing 7.0 to 10.0 kg were randomized into three groups. Each group was fed diets containing zero, twenty-five and fifty percent corn cobs as replacer for hay (*Cynodon nlemfuensis*) in maize and groundnut cake based media. Two males from each treatment group were later placed in individual metabolic cages for digestibility experiments.

Results showed that dry matter (DM) intake, weight gain, efficiency of feed utilization and nutrient digestibility values were similar for animals on rations A (zero corn cobs, 50% hay) and B (25% corn cobs, 25% hay) which were higher than values obtained for animals on ration C (50% corn cobs, zero hay). Results obtained also suggested that 25% ground corn cobs could be successfully incorporated into the diets of West African dwarf sheep for optimal utilization.

**Key Words:** Corn cobs, sheep, feed utilization and nutrient digestibility

## INTRODUCTION

Cereals like maize to a large extent constitute the main energy source of livestock feeding in Nigeria. Unfortunately the production level cannot meet demand thereby resulting in astronomical increase in prices. Animal production scientists have to search for cheaper sources of energy and protein feed ingredients.

In 1985 over 1.5 million metric tonnes of maize was produced in Nigeria (FOS, 1986). With corn cob constituting about 60% of an ear of corn, the amount of corn cob produced will be over 900,000 metric tonnes. Corn cob is either discarded or allowed to rot away. It can serve as feed for ruminants particularly during the dry season when grasses might have dried up. Corn cobs have

been fed to ruminants when chemically treated (Klopfenstein *et al.*, 1972; Paterson *et al.*, 1981; 1982). The present experiment is therefore designed to evaluate the cobs on its own merit and in combination with hay in sheep diet.

## MATERIALS AND METHODS

Twelve West African dwarf sheep, 11 to 15 months old, weighing 7.0 to 10.0 kg, were fed on three dietary treatments in order to study dry matter intake, nutrient digestibility and performance of the animals.

Four lambs (two males and two females) were randomly assigned to each of the three dietary treatments (Table 1). Corn cobs used during the experiment were obtained from the University's Teaching and

Research Farm, ground in a feed mill and stored in jute sacks.

The lambs were fed their respective diets for 3 months during which feed intakes were measured. The lambs were fed once a day at 8.00 hours and weighed once a week before the morning feeding. The animals had free access to water and mineralized salt lick. At the end of the three months on the diet, two rams from each treatment group were transferred to individual metabolism cages for collection of faeces.

#### Collection of faeces

Animals were allowed 7-days of adjustment to the cages, followed by a 5-day collection period. The total faeces voided were weighed daily and dried in forced-draught oven at 80°C for 24 hours. The dried samples were bulked, milled and kept in air tight containers until required for analysis.

#### Analytical Procedure

The concentrate feed, hay (*Cynodon nlemfuensis*) and faeces were analysed for proximate composition (A.O.A.C. 1970). Feed intake, body weight gain and nutrient digestion data were subjected to statistics (Steel and Torrie, 1960) and significance between treatment means determined by Duncan (1955) multiple range test.

### RESULT

The composition and results of chemical analysis of the experimental rations, corn cobs and hay (*Cynodon nlemfuensis*) fed to the animals is shown in Table 1. It is observed that as the level of corn cobs in the ration increased, there was an increase in crude fibre and nitrogen free extract with corresponding decrease in crude protein, ether extract and ash contents of the experimental rations.

The summaries of dry matter (DM) con-

sumption, body weight gain and efficiency of feed utilization by the West African dwarf lambs are shown in Table 2. Treatment effects on daily dry matter consumption were significant ( $P < 0.05$ ). Lambs on rations A and B consumed significantly more DM per day than those on ration C. Animals on rations A and B recorded similar average daily weight gains and these were significantly ( $P < 0.05$ ) higher than average weight gain recorded for lambs on ration C. The efficiency of feed utilization was highest for sheep on ration B while the least was obtained for those on ration C. The difference between the values of animals on ration A and B was not appreciable ( $P > 0.05$ ).

Variations observed among the treatments for digestibility coefficients (Table 3) of dry matter, crude protein, crude fibre, ether extract and nitrogen free extract were significant ( $P < 0.05$ ). Values for treatments A and B were similar ( $P > 0.05$ ), but were significantly ( $P < 0.05$ ) higher than values obtained for lambs on treatment A.

### DISCUSSION

The observed crude protein (3.34%) and ether extract (1.33%) contents of corn cobs fell within the range 2.40-3.35% crude protein and 0.50-3.00% ether extract reported elsewhere (Fetuga *et al.*, 1975; Longe and Tona, 1988) while crude fibre content (41.44%) was higher than reported range 35.60-38.00% (Devendra and McIeroy, 1982). Differences in chemical composition of the cobs could be due to pre and post harvest management practices of the corn cobs.

Mean daily dry matter (DM) consumption of the animals on different rations decreased as the protein content of the diets decreased. This result which is an agreement with Vipond *et al.* (1982) showed that the voluntary intake of low protein foods by sheep is closely related to the N content of the food. With low protein diets, the N con-

**Table 1**  
**Composition and chemical analysis of experimental rations**

<i>Ingredients (%)</i>	A	B	C		
Corn cobs	—	25.00	50.00		
Maize	34.00	34.00	34.00		
Groundnut cake	15.65	15.65	15.65		
Salt	0.35	0.35	0.35		
Hay	50.00	25.00	—		
				Corn	Hay
				cobs	
Dry Matter	87.32	87.69	88.47	88.35	87.12
Crude Protein	15.05	13.49	11.92	3.34	5.60
Crude fibre	17.46	18.11	19.16	41.44	30.05
Ether Extract	3.36	3.06	2.75	1.33	0.24
Ash	8.65	6.13	3.60	2.25	2.73
NFE	55.15	58.89	62.63	51.64	61.38

**Table 2**  
**Summaries of feed intake, performance and efficiency of feed utilization by West African dwarf sheep fed corn cobs and hay based diets**

		TREATMENT RATIIONS		
		A	B	C
<i>Parameters</i>				
Experimental period	(days)	84	84	84
Average initial weight	(kg)	8.66	9.00	7.33
Average final weight	(kg)	16.48	15.75	11.14
Average weight gain	(kg)	7.82 <sup>a</sup>	6.75 <sup>a</sup>	3.81 <sup>b</sup>
Average daily gain	(g)	90.00 <sup>a</sup>	80.00 <sup>a</sup>	50.00 <sup>b</sup>
Dry matter (DM) consumption from grass	(g/day)	288.06	240.54	—
Total dry matter consumption	(g/day)	661.80 <sup>a</sup>	612.70 <sup>a</sup>	338.70 <sup>b</sup>
Efficiency of feed utilization		7.40 <sup>a</sup>	7.70 <sup>a</sup>	6.80 <sup>b</sup>

a,b, means along the same row with different superscript are significantly different ( $P < 0.05$ ).

Rations A, B, C. — See Table 1.

**Table 3**  
**Apparent digestibility coefficients of nutrients in experimental rations**

<i>Apparent digestibility (%)</i>	A	B	C
Dry matter	85.71 <sup>a</sup>	81.58 <sup>a</sup>	68.62 <sup>b</sup>
Crude protein	90.24 <sup>a</sup>	88.61 <sup>a</sup>	80.52 <sup>b</sup>
Crude fibre	79.73 <sup>a</sup>	68.40 <sup>a</sup>	40.19 <sup>b</sup>
Ether extract	91.17 <sup>a</sup>	96.90 <sup>a</sup>	66.24 <sup>b</sup>
NFE	86.24 <sup>a</sup>	84.32 <sup>a</sup>	76.49 <sup>b</sup>

a,b means along the same row with different superscript are significantly different (P < 0.05).

tent of the digesta limits rate of fermentation in the rumen and also passage through the digestive tract. This in turn could reduce intake (Egan, 1965). The bulky and fibrous nature of corn cobs ingested could also reduce DM intake.

There was a progressive decrease in weight gain of animals as the level of corn cobs in the rations increased due to the nutritive value and feed consumption of animals as affected by the level of cobs in the rations. This observation agreed with that of Barcvanski *et al.*, (1972) as noted for cattle fed ground maize cobs.

The efficiency of feed utilization of the animals appeared to have been affected by intake, digestibility and nutritive value of the diets, which could be due to the fibre content of the rations. A number of reports (Balch and Campling, 1862; Babatunde *et al.*, 1975; Ademosun, 1976) on waste products showed that the overall digestibility is related to the crude fibre contents as digestibility declined with increasing crude fibre content of the feed as obtained in this study. The low digestion coefficient of nutrients in corn cobs would be attributed to the high degree of lignification as reported (Van Soest and McQueen, 1973).

A weight gain of 80g/day obtained for sheep on ration B is quite encouraging for

untreated corn cobs fed in combination with hay. This is of significance in dry season feeding when there could be scarcity of grass. Rather than losing weight, the animals can still be encouraged to give a fair performance.

#### REFERENCES

- ADEMOSUN, A.A. (1976). The effect of energy dilution of feed utilization and carcass quality of finishing pigs. *Nuts. Res. Intl.* 13(5): 449-461.
- A.O.A.C. (1970). Official Methods of Analysis. 10th Ed. Association of Official Agricultural Chemists, Washington, D.C.
- BABATUNDE, G.M., FETUGA, B.L., OYENUGA, V.A. and AYOADE, A. (1975). The effects of graded levels of brewers' dried grains and maize cobs in the diets of pigs on their performance characteristics and carcass quality. *Niger. J. Anim. Prod.* 2(1): 119-133.
- BACVANSKI, C., COBIC, T. and VUCETIC, S. (1972). Maize cobs and dried sugar beet pulp as sources of energy in concentrate rations for fattening cattle. *Inst. Za. Stocarstro Novisad.* 5: 8-16.
- BALCH, C.C. and CAMPLING, R.C. (1972). Regulation of voluntary food intake in ruminants. *Nutr. Abst. and Rev.* 32: 669-686.

- DEVENDRA, C. and McLEROY, G.G. (1982). Goat and sheep production in the tropics. Longman, London and N.Y.
- DUNCAN, D.B. (1955). Multiple range and multiple F- tests. *Biometrics II*: 1-42.
- EGAN, A.R. (1965). Nutritional status and intake regulation in sheep. II. The influence of sustained duodenal infusions of casein or urea upon voluntary intake of low protein roughages by sheep. *Aust. J. Agric. Res.* 16: 451-462.
- FETUGA, B.L., BABATUNDE, G.M., OLUSANYA, A.O. and OYENUGA, V.A. (1975). The composition, nutrient digestibility and energy value of maize cobs, yam peels plantain peels for three weight groups of pigs. *Niger J. Anim. Prod.* 2: 95-99.
- F.O.S. (1986). Cereal grain production figures. Federal Office of Statistics, Lagos, Nigeria.
- KLOPFENSTEIN, T.J., KRANSS, V.E., JONES, M.J. and WOOD, W. (1972). Chemical treatment of low quality roughages. *J. Anim. Sci.* 35: 418-422.
- LONGE, O.G. and TONA, G.O. (1988). Metabolizable energy values of some tropical feedstuffs for poultry. *Trop. Agric. (Trinidad)* 65(4): 358-360.
- PATERSON, J.A., KLOPFENSTEIN, A.J. and BRITTON, R.A. (1981). Ammonia treatment of corn plant residues. Digestibilities and growth rates. *J. Anim. Sci.* 53: 1592-1600.
- PATERSON, J.A., KLOPFENSTEIN, A.J. and BRITTON, R.A. (1982). Digestibility to sodium hydroxide treated crop residues when fed with alfalfa hay. *J. Anim. Sci.* 54: 19056-1066.
- STEEL, R.G.D. and TORRIE, J.H. (1960). *Principles and Procedures of Statistics*. McGraw-Hill Book Company Inc., New York.
- VAN SOEST, P.J. and McQUEEN, R.W. (1973). The chemistry and estimation of fibre. *Proc. Nutr. Soc.* 32: 123-130.
- VIPOND, J.E., HUNTER, E.A. and KING MARGARET, E. (1982). Effects of cereal and protein supplementation to swedes (*Brassia napus*) on intake and performance of pregnant and lactating ewes kept indoor. *Anim. Prod.* 34: 131-137.