INTAKE AND DIGESTIBILITY OF N'DAMA CATTLE FED CONCENTRATE DIETS CONTAINING VARYING LEVELS OF CORNCOB

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ABSTRACT
One possible way to mitigate the scarcity of quality feedstuffs during the dry season is to explore alternative feed resources. This reduces the cost of animal production without a decrease in productivity. Four N'Dama heifers with average live weight of 70 kg ± 0.21 were used to evaluate the effects of feeding concentrate containing corncob in varying proportions in combination with guinea grass (*Panicum maximum*) in a replicated 4 x 4 Latin Square design. Diets were formulated to consist of 0% corncob (CC) (T1), 25% CC (T2), 50% CC (T3) and 75% CC (T4). Crude protein and ash contents of diets were (16.7 -18.4%) and 5.0 – 6.9%) respectively. The cattle on diet 4 had the least DMI (73.8%), CPD (76.9%) and ME (24.6 MJ/Kg DM). Corncob can be used in concentrate ration for cattle up to 50% inclusion level.

INTRODUCTION
The dry season is usually a critical time for cattle because of acute shortage of feed and the few types of forage available are of very poor nutritive quality i.e. low in crude protein and high in crude fibre, which results in low voluntary intake and low digestibility. Low pasture quality and limited availability of water are reflected in low production and reproduction performance. Undernourished herds of cattle are susceptible to diseases and parasites, and in extreme cases they lose body weight and eventually die. Therefore, adequate nutrition is essential to exploit the genetic potentials of cattle breeds in Nigeria. A major constraint facing livestock development is the lack of adequate supplies of feedstuffs at economic prices. Feeds represent the greatest proportional cost in livestock production and its availability is affected by seasonal variation in feed quantity and quality which causes fluctuations in animal nutrition and productivity throughout the year in particular during the season. There are large quantities of corncobs which could be fed to ruminants instead of being wasted. Ruminants prefer feedstuffs relatively rich in crude fibre (Williamson and Payne, 1987)

The nutritional potential should be harnessed through processing for ruminant feeding. Therefore, this study was designed to evaluate the intake and digestibility of N'Dama cattle fed concentrate with varying inclusion levels of corncob.

MATERIALS AND METHOD
The study was carried out in the Large Ruminant Unit of the Institute of Agricultural Research and Training, Moor Plantation, Ibadan. The experimental house and individual pens for the cattle were cleaned with disinfectant before used. Individual pens were covered with wood shavings up to 5 cm depth. Four N'Dama heifers with average live weight of 70 kg ± 0.21 were used to evaluate the effects of feeding concentrate containing corncob in varying proportions in combination with guinea grass (*Panicum maximum*) in a replicated 4 x 4 Latin Square design. The cattle were allowed 14 days preliminary period in order to stabilize them with harnessing bags in the pens. They were fed *Panicum maximum ad libitum* and cassava peel with clean water during the adjustment period.

Feeding trial and digestibility

The cattle were fed with concentrate without corn cob (T1), concentrate having 25 % replacement of corn bran (CB) by corncob (CC) (T2), concentrate having 50% replacement of CB by CC. (T3) and concentrate having 75% replacement of CB by CC. (T4). The N'Dama heifers were fed at 0900 hr and 1600hr with the diets and were offered clean water daily. Feed intake on daily was monitored for the 14d period, followed by a collection period of 7 days per diet with the use of harnessing bag. Feed and faecal samples were pooled and 10% collected and oven dried at 105°C until constant weight. The samples were milled for analytical procedures.

Chemical analysis

Dried samples of feeds and faeces were milled at different times using a 2 mm sieve in a Thomas hammer mill. Samples were analyzed for nitrogen, dry matter (DM) content, ether extract and ash content (AOAC, 2000) while neutral detergent fiber (NDF), acid detergent fiber (ADF) and acid detergent lignin (ADL) were

determined according to method of Van Soest *et al.* (1991).

Statistical analysis

Data obtained were analyzed with the general linear model of SAS (1998) and the Duncan option of SAS (1998) and multiple range tests were used to detect significant differences among means at a level of 5%.

RESULTS AND DISCUSSION

The gross composition of the compounded ration is shown on Table 1. The chemical composition of the diet containing varying inclusion levels of corncob differed ($P<0.05$) significantly among the treatments (Table 2). The crude protein content of diet 1 was the highest and was followed by value obtained in diet 2. The ether extract and ash concentrations decreased with increasing level of corncob in the diets. There were no significant differences ($P>0.05$) in the neutral detergent fibre (NDF) values of diet 1 and 2 as well as the NDF of diet 3 and 4. The highest feed intake was observed in cattle fed diet 1 (Table 3). Feed intake decreased with increasing levels of inclusion of the corncob in the compounded ration. The lowest dry matter digestibility value was observed in cattle fed diet 4. Palatability, gut fill and the outflow rate/retention time in the rumen affect feed intake (Ahamefule and Elendu, 2010). The crude protein (CP) digestibility of cattle on diets 1 and 2 were similar ($P>0.05$) while cattle on diet 4 had the least CP digestibility (76.9%). Cattle on diet 1 had the highest value of NDF (89.5%) and were followed by cattle fed diet 2. The digestible and metabolizable energy intake of the diets differed ($P<0.05$) significantly. Diet 4 had the least values of 24.6 and 19.7 MJ/Kg DM respectively.

CONCLUSION

The intake and digestibility parameters decreased with increasing levels of corncob inclusion in the diets. Corncob could be used to replace corn bran at 50 % inclusion levels in concentrate ration. Higher inclusion levels could lead to nutritional problems.

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Table 1: Gross composition of experimental diet fed to N'Dama cattle

Ingredient (% on DM)	Corncob inclusion levels in the compounded ration			
	Diet 1 control	Diet 2 (25%)	Diet 3 (50%)	Diet 4 (75%)
Maize	15	15	15	15
Wheat offal	20	20	20	20
Corn cob	-	7.5	15	22.5
Corn bran	30	22.5	15	7.5
Palm kernel cake	28	28	28	28
Limestone	6	6	6	6
Fish (72%)	0.4	0.4	0.4	0.4
Grower premix	0.3	0.3	0.3	0.3
Salt	0.3	0.3	0.3	0.3
Total	100	100	100	100

Table 2: Chemical composition of compounded ration containing corncob in varying proportions

Parameters	Diet 1 control	Diet 2 (25%)	Diet 3 (50%)	Diet 4 (75%)	SEM
Dry matter	90.7	90.9	91.0	90.0	0.18
CP	18.4[a]	18.2[a]	17.9[b]	16.7[c]	0.23
Ether extract	3.6[a]	3.4[b]	3.0[c]	2.6[d]	0.17
Ash	6.9	6.5	5.8	5.0	1.10
NDF	56.4[a]	57.2[a]	51.8[b]	49.0[b]	3.51
ADF	37.2	38.7	39.0	39.3	1.07
ADL	6.23	6.8	7.1	7.6	0.94

Table 3: Intake and apparent digestibility of N'Dama cattle fed diet containing corncob in varying proportions

Parameters	Diet 1 (0%)	Diet 2 (25%)	Diet 3 (50%)	Diet 4 (75%)	SEM
Total feed intake (kg DM)	4.0[a]	3.6[b]	3.3[c]	2.4[d]	0.1
Dry matter (%)	90.0[a]	90.2[a]	86.5[b]	85.8[b]	2.15
Crude protein (%)	87.3[a]	86.5[a]	80.4[b]	76.9[c]	1.84
Neutral detergent fibre (%)	89.5[a]	85.3[b]	78.6[c]	72.4[d]	2.61
Acid detergent fibre (%)	86.4[a]	85.0[a]	80.4[b]	74.6[c]	2.34
Acid detergent lignin (%)	78.8[a]	75.2[b]	70.8[c]	66.8[d]	3.07
Ether extract (%)	83.4[a]	78.6[b]	73.3[c]	67.5[d]	2.88
Ash (%)	89.1[a]	84.2[b]	80.2[b]	77.4[b]	4.02
Energy concentration					
DE (MJ/Kg DM)	39.5[a]	36.1[b]	29.4[c]	24.6[d]	2.88
ME (MJ/Kg DM)	31.6[a]	28.9[a]	23.5[b]	19.7[c]	2.74

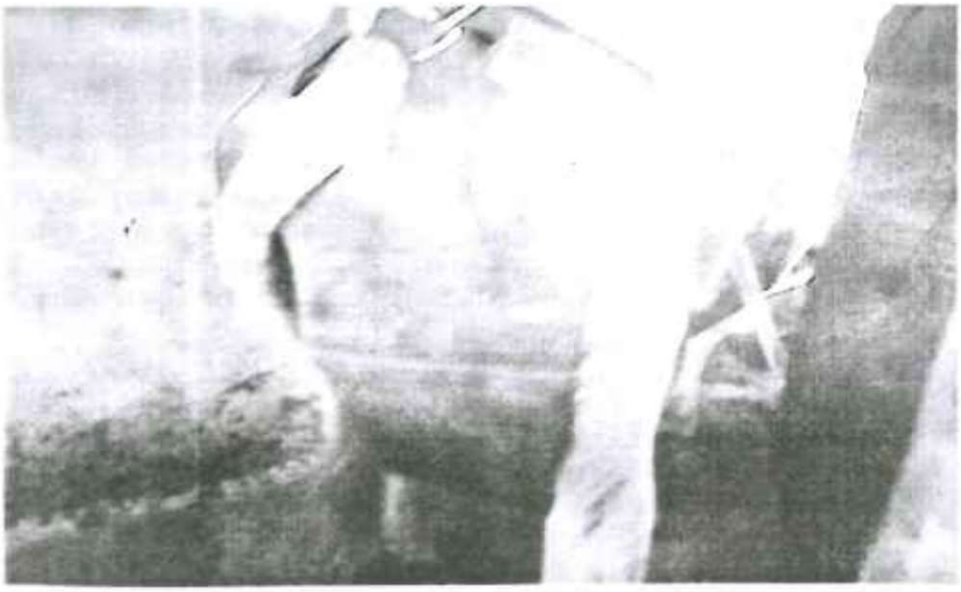

Plate 1: N'dama cattle on harnessing bag for faecal collection