GRAIN REPLACEMENT VALUE OF CASSAVA AND SWEET-POTATO FOR GROWING LAMBS

I. EFFECT ON PERFORMANCE, CARCASS CHARACTERISTICS AND COMPOSITION

By

TEWE, O. O.; A. O. AKINSOYINU and Y. SULEIMAN-Oba

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

SUMMARY

TWENTY-FOUR rams of the West African Dwarf X Yankasa crosses, 6 to 7 months old, ranging in liveweight from 11 to 14 kg were randomly allotted to maize, sweet potato and cassava based rations. These rations constituted the concentrates which were fed as supplement to *Cynodon nlemfuensis*. Three rams from each treatment were slaughtered at the end of 30 day and another set of three rams each were slaughtered on the dietary treatments and other nine, 140 day later.

Replacement of the conventional maize grains by dried milled cassava and potato tubers in sheep diet did not depress the growth rate, dressing-out percentages, major cuts, quality of the organs, and the general performances of the animals. Sweet potato based diet however improved the feed per gain estimate, the fats and protein content of the carcass. The highest proportion of lean meat was produced by the animals fed cassava-based diet.

INTRODUCTION

THE potentials of roots and tubers as a substitute for conventional energy sources have been well documented in literature (Oyenuga, 1968; Nestle and Macintyre, 1973; Tewe 1975).

While a number of reports exist on the evaluation of cassava as an energy source in monogastric rations (Nestle and Macintyre, 1973; Nestle, 1973; Tewe, 1975) there is some paucity of information on the evaluation of this root in ruminant ration especially in the tropical countries of the world. Sweet potato has also been demonstrated as a better potential of calorie yield per hectare per year than cassava (I.I.T.A. Report, 1977).

This paper reports parts of a general investigation into the grain replacement value of cassava and sweet potato on the performance, carcass characteristics and chemical composition of growing lambs.

MATERIALS AND METHODS

Animals and their management

Twenty-four rams of crosses of the West African dwarf and Yankasa, 6 to 7 months old and weighing 11 to 14 kg, were used in the experiment. Before the experiment the animals were kept on concrete floor pens where they were offered about 2.0 kgs concentrates per head per day. They were also allowed free grazing on *cynodon* pasture. Clean fresh water and trace mineralized salt licks were provided *ad lib*.

Preparation of Samples

Cassava and sweet potato tubers, freshly harvested, were obtained from plots at the I.I.T.A. Ibadan. The tubes were washed and chopped with peels in a shredding machine before drying in an oven at 60°C for 48 hours and 72 hours for cassava and sweet potato respectively. The dried brittle chunks were then milled into flour.

Diets and plan of the experiment

The three rations compounded from the milled tubers of cassava, sweet potato and maize are shown in Table 1. These rations constituted the concentrates which

TABLE 1

Gross Composition of Experimental Rations

Ingredients %	Treatment		
	I	II	III
Maize	75.0	—	—
Sweet Potato	—	66.1	—
Cassava	—	—	70.9
Groundnut Cake	19.5	28.4	23.6
Brewers Grain	3.8	3.8	3.8
Vit. A & D Crumbles	1.2	1.2	1.2
Salt (NaCl)	0.5	0.5	0.5
TOTAL	100.0	100.0	100.0

were fed as supplement to *Cynodon nlemfuensis*.

The 24 rams were randomised into three groups of 8 animals each for the three sources of energy. Each group was then fed each supplementary ration *ad libitum* and a basal diet of fresh grass (*Cynodon nlemfuensis*). 0.5g of the fresh grass was offered twice daily at about 8.00 and 14.00 hr. Any grass or concentrate residues were collected, weighed and stored for chemical analysis. The rams were individually kept in concrete floored pens. The experiment lasted for twenty weeks.

Three rams from each group were slaughtered at the end of the fourth week while another three were slaughtered at end of the twentieth week.

Slaughter Technique

A comparative slaughter technique was used to evaluate the carcass. The rams were starved for 12 hours and weighed just prior to slaughter. The animals were bled by cutting the throat and then severing the head at its articulation with the atlas. The dressed carcasses were weighed before they were chilled in a cold room maintained at -5°C for 24 hours. The gut was weighed before and after cleaning. The heart, liver without the gall bladder, the mesenteric fat (if any), the skin, the kidneys with the pelvic fat, and the limbs distal to the carpal and tarsal, were also weighed.

Jointing of the Carcass

The frozen carcass was divided down the spinal column using a meat band saw. Each half was weighed. The left half was divided into the following cuts; the leg, loin, ends (spare ribs plus belly), and the sholder as described by Akinsoyinu *et al* (1975). Each of the cuts was weighed and the weight was doubled in each case before being expressed as a percentage of the chilled carcass. (Statistical analysis showed that the apparent variation in the weight of the left and right sides of the carcasses was not significant). The leg plus loin cuts were then separated into lean and bone components to obtain meat to bone ratio. The liver, kidney and meat from the loin plus leg, were cut into pieces, homogenised separately and stored at -5°C until they were required for analysis. 2.0g of the freshly homogenised samples were weighed, frozen with liquid nitrogen and then freeze-dried to constant weight for dry matter determination. The freeze dried samples were crushed in each case and also stored at -5°C until required for analysis.

Analytical Procedures

The analysis of the freshly-homogenised liver, kidney and meat specimens for the nitrogen and fat content followed the same procedure as described by Akinsoyinu *et al* (1975). The proximate composition and gross energy value of the concentrate supplement and grass were.

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determined by the AOAC methods (1970).

RESULTS

The proximate composition and gross energy values of the concentrate supplements and grass are shown in Table 2. The grass fed had a fairly high crude fiber content due to the effect of the dry season which was just setting in.

Dry matter intake and daily gains

The mean weekly dry matter (DM) intake and daily live weight gains are shown in Table 3. In general the animals consumed more of the concentrate than grass and the differences were highly significant ($P < 0.01$). The rams fed the sweet potato ration recorded the highest daily DM consumption from the concentrates followed by those animals maintained on cassava based concentrate (843.9 ± 32.9). The effect of treatment on DM intake from grass was not significant.

Replacing maize grains with sweet potato or cassava flour in rations did not have a significant effect on growth rate. An appraisal of the performances of the animals revealed that the rams fed sweet potato consumed the highest feed per unit weight gain. Although the differences were not significant, the data showed that the feed was not efficiently utilized as the maize or cassava based diet. It is also worth noting that three of the animals fed on sweet potato diets experienced occasional signs of diarrhoea.

Dressing-out Percentage

Tables 4 and 5 show the slaughter characteristics of the animals after 30 and 140 days on the trial. The variations in the values of the dressing-out percentage for the animals on the same treatment were not significant (Table 4 & 5). The highest dressing-out percentage value of $50.58 \pm .49$ was recorded for the rams fed cassava based diet and the corresponding estimate of 48.0 ± 0.99 and 49.23 ± 0.71

TABLE 2

Proximate composition and Energy value of Concentrates and Grass

Constituent		Maize	Sweet Potato	Cassava	Ration I	Ration II	Ration III	Grass
%								
Dry Matter	.. ..	86.30	83.66	85.48	86.44	83.39	83.56	37.49
Crude Protein	.. ..	11.36	7.21	3.89	16.27	16.56	16.13	6.67
Crude Fibre	.. ..	1.20	3.50	1.60	1.70	4.50	4.80	27.46
Ether extract	.. ..	3.83	1.37	0.695	4.63	2.36	2.07	1.10
Ash	.. ..	1.20	6.05	4.20	6.28	6.85	7.00	9.86
N.F.E.	.. ..	68.71	65.53	72.09	57.56	53.12	53.56	54.91
G.E. (Kcal/g)	.. ..	3.92	3.59	2.69	4.14	3.67	3.99	3.14

TABLE 3

Performance of growing lambs fed maize, sweet potato and cassava based rations

Parameter					Experimental Maize	Variable Sweet Potato	Cassava
Daily DM grass intake g	.. ..	.. ..	.. ..	.. ..	257.4 $\pm$ 35.0	255.9 $\pm$ 23.1	253.0 $\pm$ 23.6
Daily D.M. Concentrate intake g	.. ..	.. ..	.. ..	.. ..	662.4 $\pm$ 37.4	843.9 $\pm$ 32.2	708.3 $\pm$ 26.7
Total Daily D.M. Intake g	.. ..	.. ..	.. ..	.. ..	919.8 $\pm$ 48.1	1099.8 $\pm$ 67.7	961.3 $\pm$ 60.1
Initial Live wt. kg.	.. ..	.. ..	.. ..	.. ..	11.9 $\pm$ 0.41	12.2 $\pm$ 0.60	12.1 $\pm$ 0.43
Final Live wt. kg.	.. ..	.. ..	.. ..	.. ..	27.2 $\pm$ 0.95	27.3 $\pm$ 0.97	27.5 $\pm$ 0.93
Daily weight gain g.	.. ..	.. ..	.. ..	.. ..	121.1 $\pm$ 9.2	119.9 $\pm$ 13.0	122.2 $\pm$ 18.4
DM Intake/Unit wt. gain	.. ..	.. ..	.. ..	.. ..	7.6 $\pm$ 0.39	9.2 $\pm$ 0.47	7.9 $\pm$ 0.73

TABLE 4

Dressing out percentage with a Display of Mean slaughter weights and chilling percents of Young lambs slaughtered after 30 days preliminary feeding on maize, sweet potato, and cassava based rations

Characteristics	Treatments		
	Maize	Sweet Potato	Cassava
Live wt. at slaughter kg	16.43±0.49	16.26±0.33	17.27±0.41
Empty live weight kg	11.60±0.37	11.49±0.49	12.61±0.71
Warm Carcass Weight kg.	7.76±0.29	7.28±0.73	8.64±0.51
Cold Carcass Weight kg.	7.30±0.24	6.90±0.77	8.13±0.54
Chilling percents	5.93±0.91	5.22±0.46	5.90±0.49
Weight of each (Right kg	3.61±0.53	3.40±0.59	4.10±0.57
half of Carcass (Left kg	3.62±0.52	3.45±0.57	4.10±0.60
Dressing out percentage.	44.43±0.49	42.44±0.53	47.08±0.68

TABLE 5

Dressing out percentage with a Display of Mean slaughter weights and chilling percents of growing lambs slaughtered after 140 days on maize, sweet potato and cassava based rations

Characteristics	Treatments		
	Maize	Sweet Potato	Cassava
Live wt. at slaughter kg	25.12±0.1	29.09±0.41	28.53±0.63
Empty live weight, kg	18.47±0.77	22.02±0.81	22.16±0.43
Warm Carcass weight kg	12.39±0.54	14.78±0.93	15.34±0.71
Cold Carcass weight kg	12.00±0.53	14.32±0.87	14.43±0.59
Chilling percent	3.15±0.31	4.11±0.29	5.93±0.41
Weight of each (Right kg	5.95±0.16	7.15±0.72	7.25±0.17
half of Carcass (Left kg	5.90±0.19	7.10±0.57	7.15±0.20
Dressing out percentage.	48.00±0.99	49.23±0.71	50.58±0.49

for animals on maize and sweet potato based diet respectively. The differences were not significant ($P > 0.05$).

The Cuts

The cuts as percentage of the chilled carcass are shown in Table 6 and 7. The variations in these estimates between the first and second slaughter were not significant. The percentage values of leg cut for animals fed maize, sweet potato and cassava based diets were 1.88, 2.05 and 2.28 respectively. The corresponding values for loin cuts were 6.16, 5.95, and 5.90 respectively for all treatments. The treatment effects on these parameters were not significant.

The sets and ends as percentage of the carcass were lowest on the maize ration as compared to the cassava and potato rations, the differences were however not significant.

The treatment effects on the shoulder cuts were also not significant ($P > 0.05$). The highest value (18.92±0.19%) was recorded for animals fed cassava based ration (Table 7). The bone to lean ratio for the thigh and loin cuts combined was about 0.23 (Table 11) for all treatments. The treatment effect was not however significant. This ratio ranged from 0.38 for animals fed cassava based diet to 0.49 for those on sweet potato based diet in the first slaughter (Table 10) being significantly different ($P < 0.05$) from the other groups.

The kidneys plus pelvis fats and the organs

The results obtained for the kidneys plus the pelvic fats as percentages of the empty live-weight at the second slaughter were 1.97%, 1.73% and 1.07% for sheep fed maize, sweet potato and cassava based diets respectively (Table 9). Similar results for the liver feet, head and the gut

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TABLE 6

Weights of cuts as percentages of chilled carcass weight of young lambs slaughtered after 30 days preliminary feeding of maize, sweet potato and cassava based rations

Characteristics							Treatments		
							Maize	Sweet Potato	Cassava
Leg:	Weight (kg)	..	..	..	..	..	1.31±0.3	1.24±0.9	1.31±1.1
	Percentage	..	..	..	..	..	17.89±0.81	15.80±0.64	18.91±0.1
Loin:	Weight (kg)	..	..	..	..	..	.50±0.9	.54±0.7	.46±0.3
	Percentage	..	..	..	..	..	6.79±0.54	6.65±0.3	6.67±0.77
Sets:	Weight (kg)	..	..	..	..	..	0.51±0.4	0.40±0.6	0.43±0.9
	Percentage	..	..	..	..	..	6.99±0.13	4.92±0.54	6.23±0.54
Ends:	Weight (kg)	..	..	..	..	..	0.49±0.7	0.65±0.4	0.48±0.7
	Percentage	..	..	..	..	..	6.65±0.30	6.90±0.47	6.88±0.54
Shoulder:	Weight (kg)	..	..	..	..	..	0.91±0.1	1.37±0.7	1.36±0.3
	Percentage	..	..	..	..	..	12.47±0.30	16.80±0.83	19.71±0.73

TABLE 7

Weights of Cuts as percentages of chilled carcass weight of growing lambs slaughtered after 14 days on maize, sweet potato and cassava based rations

Characteristics							Treatments		
							Maize	Sweet Potato	Cassava
Leg	Weight (kg)	..	..	..	..	..	1.88±0.7	2.05±0.03	2.28±0.07
	Percentage	..	..	..	..	..	15.6±0.30	14.32±0.73	15.77±0.34
Loin:	Weight (g)	..	..	..	..	..	0.74±0.07	0.85±0.01	0.85±0.04
	Percentage	..	..	..	..	..	6.16±0.51	5.95±0.11	5.90±0.76
Sets:	Weight (g)	..	..	..	..	..	0.51±0.03	0.68±0.01	0.68±0.08
	Percentage	..	..	..	..	..	4.27±0.09	4.76±0.13	4.73±0.45
Ends:	Weight (g)	..	..	..	..	..	0.68±0.07	0.91±0.01	0.91±0.01
	Percentage	..	..	..	..	..	5.69±0.16	6.34±0.19	6.30±0.09
Shoulder:	Weight (g)	..	..	..	..	..	2.11±0.09	2.39±0.02	2.73±0.03
	Percentage	..	..	..	..	..	17.56±0.41	16.66±0.83	18.92±0.19

TABLE 8

Cuts parts as percentages of Empty live weight of young lambs slaughtered after 30 days preliminary feeding on maize, sweet potato and cassava based rations

Characteristics							Treatments		
							Maize	Sweet Potato	Cassava
Liver	Weight (g)	..	..	..	..	..	320.1±14.16	370.4±21.23	450.0±13.71
	Percentage	..	..	..	..	..	2.76±0.11	3.22±0.19	3.57±0.23
Kidneys and pelvic fats; Weiths (g)	Weight (g)	..	..	..	..	..	210.6±18.97	220.3±14.14	125.111.94
	Percentage	..	..	..	..	..	1.81±0.11	1.92±0.09	1.00±0.12
Pluck:	Weight (g)	..	..	..	..	..	9.05±66.92	1.025±82.19	9.75±69.16
	Percentage	..	..	..	..	..	7.0±0.71	8.92±0.39	7.73±0.28
Feet:	Weight (g)	..	..	..	..	..	545.7±29.16	495.342.41	565.3±29.70
	Percentage	..	..	..	..	..	4.70±0.17	4.31±0.21	4.48±0.19
Head:	Weight (g)	..	..	..	..	..	1.250±117.3	1.360±99.6	1.305±126.1
	Percentage	..	..	..	..	..	10.78±0.91	11.84±0.91	10.35±0.62
Gut Empty:	Weight (g)	..	..	..	..	..	1,875±121.7	1,870±147.3	1.965±163.9
	Percentage	..	..	..	..	..	16.16±1.16	16.289.49	15.58±0.38
Intestinal fats: Weights (g)	Weight (g)	..	..	..	..	..	205.6±69.12	182.1±1.32	227.0±76.11
	Percentage	..	..	..	..	..	1.77±0.09	1.58±0.12	1.80±0.07

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are shown in Table 9. The treatment did not show a significant effect on these parameters.

The chemical composition (fat and protein) of the liver and kidney (Table 11) revealed that the crude protein content of the kidneys of the fed sweet potato ration was the highest (83.33 ± 0.56). The

difference between this value (83.33) and any other similar estimate for sheep on cassava or maize ration was highly significant ($P < 0.01$). The highest kidney fat (5.36g/100gDM) was also recorded for the same group of animals on sweet potato based diet and was markedly low on the cassava diet.

TABLE 9

Cut parts as percentages of Empty live weight of growing lambs slaughtered after 140 days preliminary feeding on maize, sweet potato and cassava based rations

Characteristics	Treatments		
	Maize	Sweet Potato	Cassava
Liver: Wight (g)	488.1 $\pm$ 17.21	488.3 $\pm$ 14.13	625.6 $\pm$ 21.29
Percentage	2.64 $\pm$ 0.08	2.20 $\pm$ 0.04	2.88 $\pm$ 0.12
Kidneys and pelvic fats: Weight (g)	363.6 $\pm$ 2212	238.1 $\pm$ 16.19	375.5 $\pm$ 18.34
Percentage	1.97 $\pm$ 0.08	1.07 $\pm$ 0.08	1.73 $\pm$ 0.07
Pluck: Weight (g)	1305 $\pm$ 113.17	1420 $\pm$ 201.16	1594 $\pm$ 142.77
Percentage	7.07 $\pm$ 0.09	6.41 $\pm$ 0.21	7.35 $\pm$ 0.15
Feet: Weight (g)	857.3 $\pm$ 49.24	795.6 $\pm$ 72.16	738.1 $\pm$ 50.73
Percentage	4.61 $\pm$ 0.15 ^a	3.59 $\pm$ 0.18 ^b	3.40 $\pm$ 0.23 ^b
Head: Weight (g)	18.75 $\pm$ 174.89	21.60 $\pm$ 209.3	2160 $\pm$ 173.14
Percentage	10.15 $\pm$ 0.41	9.75 $\pm$ 0.18	9.95 $\pm$ 0.99
Gut Empty: Weight (g)	2045 $\pm$ 193.49	1700 $\pm$ 197.30	1875 $\pm$ 201.13
Percentage	11.08 $\pm$ 0.7 ^a	7.67 $\pm$ 0.73 ^b	8.64 $\pm$ 0.41 ^b
Intestinal fats: Weight (g)	568.4 $\pm$ 63.79	511.1 $\pm$ 57.38	614.3 $\pm$ 63.1
Percentage	3.08 $\pm$ 0.47	2.31 $\pm$ 0.38	2.83 $\pm$ 0.41

a,b, = means without common superscript are significantly different ($P < 0.05$)

TABLE 10

Physical and Chemical Analysis of Organs and Muscles of young lambs slaughtered after 30 days preliminary feeding on maize, sweet potato and cassava based rations

Charateristics	Treatments		
	Maize	Sweet Potato	Cassava
KIDNEY			
Dry Matter (%)	34.74 $\pm$ 3.73	36.74 $\pm$ 5.13	37.68 $\pm$ 3.01
Fats (g/100g DM)	5.90 $\pm$ 0.34	4.60 $\pm$ 0.37	6.70 $\pm$ 0.49
Crude Protein (g/100g DM)	77.0 $\pm$ 0.85	82.29 $\pm$ 0.93	84.80 $\pm$ 0.45
LIVER			
Dry matter (%)	25.67 $\pm$ 0.71	26.28 $\pm$ 1.21	26.13 $\pm$ 0.45
Crude Protein (g/100g DM)	71.97 $\pm$ 0.61	69.33 $\pm$ 0.61	73.86 $\pm$ 0.43
Fats (g/100g DM)	4.14 $\pm$ 0.30	4.13 $\pm$ 0.71	4.95 $\pm$ 0.32
THIGH PLUS LOIN			
Total weight (g)	1,120 $\pm$ 213.1	970 $\pm$ 192.5	1,255 $\pm$ 227.3
Total lean meat (g)	765.3 $\pm$ 192.6	650.1 $\pm$ 141.3	910.7 $\pm$ 185.3
Total bone (g)	355.3 $\pm$ 416	320.0 $\pm$ 37.3	345.1 $\pm$ 46.6
Bone to lean ratio	0.47	0.49	0.38
Dry matter of meat (%)	20.39 $\pm$ 0.93	19.89 $\pm$ 0.49	20.29 $\pm$ 0.36
Crude protein of meat (g/100g DM)	82.97 $\pm$ 0.41	81.94 $\pm$ 0.76	79.95 $\pm$ 0.33
Fats (g/100g DM)	17.06 $\pm$ 0.31	15.46 $\pm$ 0.13	17.55 $\pm$ 0.07

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TABLE 11

Physical and Chemical Analysis of organs and Muscles of growing lambs slaughtered after 140 days feeding on maize, sweet potato and cassava based rations

Characteristics	Treatments		
	Maize	Sweet Potato	Cassava
KIDNEY			
Dry matter (%)	40.13 ± 3.73	33.10 ± 5.62	37.65 ± 5.10
Crude Protein (g/100g DM)	71.41 ± 0.49 ^b	83.33 ± 0.56 ^b	73.29 ± 0.80 ^b
Fats (g/100g DM)	4.92 ± 0.27	5.36 ± 0.41	1.48 ± 0.21
LIVER			
Dry matter (%)	49.36 ± 0.56	38.97 ± 0.93	45.87 ± 0.37
Crude Protein (g/100g DM)	45.77 ± 0.71	53.64 ± 0.44	48.62 ± 0.44
Fats (g/100g DM)	2.32 ± 0.03	4.16 ± 0.12	2.02 ± 0.07
THIGH PLUS LOIN			
Total weight (g)	1,703 ± 16.3	1,932 ± 231.0	1877 ± 193.2
Total lean meat (g)	1,381 ± 212.7	1,612 ± 283.4	1,529 ± 218.4
Total bone (g)	322.1 ± 37.3	320.0 ± 47.3	348.6 ± 218.4
Bone to lean ratio	0.23	0.20	0.23
Dry matter of meat (%)	44.13 ± 0.86	38.84 ± 0.73	44.78 ± 0.73
Crude protein of meat (g/100g DM)	42.83 ± 0.27	47.49 ± 0.61	43.73 ± 0.77
Fats (g/100g DM)	19.53 ± 0.76 ^{ab}	22.34 ± 0.45 ^a	14.88 ± 0.73 ^b

a,b, means without common superscripts horizontal rows are significantly different ($P < 0.01$).

DISCUSSION

Results obtained for the performance characteristics of the animals indicate a greater consumption of total DM by sheep on the sweet potato based diet. This could be due to the relatively higher content of soluble sugar in sweet potato (Oyenuga, 1968; Kay, 1973) which increases the palatability as compared with maize and cassava. The feed consumption of the animals on all treatments followed an increasing trend until a slight decrease between the 5th and 7th week which could be due to the drought effect on the grass fed with a considerably low moisture content. This did not however reflect on the growth performances of the animals.

Although the treatment effect on live-weight gains was not significant, the trends showed that animals fed cassava based diet recorded the highest growth rate. Similar observation has been reported elsewhere in an attempt to evaluate cassava tubers and maize grains in sheep diet (Job, Tewe, Loosli and Oyenuga,

1976). However the lower estimate for weight gain per unit feed intake observed for animals on the sweet potato diet may be due to the occurrence of occasional diarrhoea as result of the excessive consumption of a high soluble sugar concentrate like sweet potato to based diet. Such feedingstuff tends to produce some laxative effects and metabolic disturbances as observed in pigs fed molasses which could be checked by inclusion of fibrous products.

The variations observed in the carcass characteristics and compensation of the animals in the first slaughter were not significant (Table 4,6,8,& 10). This showed, that the changes observed in the second slaughter were due largely to the treatment effects. The dressing-out percentage values of 48.0,49.2 and 50.6 for animals fed maize, sweet potato and cassava based diets respectively fall within the range of 48 to 52% for Angora wethers (Miller, Jones and Burt, 1943).

Sample joints have been investigated as a suitable index for estimating the

composition of the total carcass (Preston and Gee, 1957; Kirton and Barton, 1962; Field, Kemp and Varney, 1963). The combination of the two joints, the one relatively late developing (the thigh) and the other relatively early developing (the loin) offer greater opportunity of success in estimating the bone, muscle and fat of the carcass (Kirton, Barton and Rae, 1962). The bone to meat ratio of 0.23, 0.20, 0.23 for the animals fed maize, sweet potato and cassava diet respectively indicate a similarity in the deposition of bone and meat in all the experimental animals except those fed on sweet potato based ration (Table 11). Comparative values of the crude protein and fat contents (g/100gDM) of the meat from the thigh plus loin cuts also showed that the sheep fed sweet potato ration recorded the highest carcass fat and protein content which were significant ($P < 0.05$).

Weniger (1966) reported a high degree of correlation between the weights of the kidney plus pelvic fats and the total fat in a carcass. That the treatment effects on the weights of the kidney plus pelvic fats as a percentage of the empty body weight was not significant, suggested that the live-weight gain of the experimental animals could not have been due to excessive accumulation of fats.

The variations obtained as percentage of the carcass, pluck, feet, head, gut empty as percentages of the empty live-weight could not be traced to the effect of replacing maize grains with sweet potato or cassava on the experimental animals.

The results from this study therefore revealed that sweet potato and cassava tubers so dried and milled can successfully replace the conventional maize grains in sheep diet without depressing the performances, carcass characteristics and the quality of the organs and muscles. Sweet potato based diet increased the fat and protein content of the carcass and the effect was significant ($P < 0.05$.)

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