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ORIGINAL RESEARCH ARTICLE

Effect of sex on the performance of West African Dwarf goats fed Cassava peels – pigeon pea (*Cajanus Cajan*) hay supplemented with concentrate

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ABSTRACT

The seasonal fluctuations of pasture and fodder crops in quantity and quality make raising of goats on range an unprofitable venture hence, the need to improve the nutrition of these animals with leguminous browse plant leaves and concentrate formulations based on locally available and non-competitive feedstuffs. This study was therefore designed to evaluate the effect of sex on the nutrients intake, weight gain, nitrogen retention and feed to gain ratio of West African Dwarf (WAD) goats fed cassava peels – Cajanus cajan hay supplemented with concentrate using twenty-four (24) WAD goats aged 2-3 years, weighed 13 ±2.14kg averagely. Four diets were formulated such that cassava peel (100%) was replaced with Cajanus cajan hay at 0 (A), 25 (B), 50 (C), and 75% (D) respectively. Six goats (three does and three bucks) were assigned to each of the four experimental diets supplemented with 300g of concentrate per goat per day for 93days in a 2x4 factorial arrangement in completely randomized design. The dry matter (DM) content of diets ranged from 90.13 (diet A) to 92.81% (diet C), crude protein (CP) content ranged from 5.51 in diet A to 16.10% in diet D. Nutrients intake by the goats was significantly (P<0.05) influenced by the treatment. Dry matter, crude protein intake and apparent digestibility increased with increased inclusion of Cajanus cajan hay in the diets. It implied that the diets had adequate dietary protein and energy that enhanced the digestion of nutrients. The effect of sex on nutrients intake depict no significant (P>0.05) difference however, does consumed more feeds than the bucks. Results of interaction between sexes and nutrients intake were significantly (P<0.05) influenced by the treatment however, does fed diet D consumed more feed (471.90g/day) than the bucks. Results of weight gain (29.68gd^{1}) and feed to gain ratio (12.64) indicated that the does performed better than the bucks. This study revealed that cassava peels and Cajanus cajan hay supplemented with concentrate no doubt improved the performance of the goats however, the substitution of cassava peels with Cajanus cajan hay at 25% and 75% (diet D) supplemented with concentrate was more acceptable to the goats. The use of cassava peel supplemented with Cajanus cajan as feed will enhance goat production as well as encourage the cultivation of Cajanus cajan as it is going into extinction in Nigeria.

Keywords: *Cajanus cajan,* cassava peel, goats, performance, supplemented

INTRODUCTION

One of the major constraints to goat production in Nigeria is inadequate supply of quality feed. The seasonal fluctuations of pasture and fodder crops in quantity and quality make raising of goats on range an unprofitable venture. Any program aimed at improving goat production must address the important issue of year round production of feed (Fajemisin *et al.,* 2013). Therefore, there is the need to change or augment the nutrition of these animals with concentrate formulations based on locally available and non-competitive feedstuffs. Some of these feed materials, otherwise known as alternative feedstuffs include post-harvest crop residues, agro-industrial by-products and leguminous plants such as *Cajanus cajan, Moringa oleifera and Gliricidia sepium* forages (Aregheore *et al.,*1998). Cassava peel is a crop residue / industrial waste derived from cassava tuberous root processing. Its nutritional content and limitations in ruminant nutrition have been extensively studied (Fajemisin *et al.,* 2013). Due to continuous demand for the cassava crop as

staple food in Nigeria, the by-products, especially the peels, are largely available but underutilized (Aro *et al.,* 2008).

Small ruminants have the ability to convert poor quality feedstuffs, such as hay of grasses, legumes and forages, farm wastes and crop residues especially cassava peels that are unsuitable for human consumption to meat and milk which in turn becomes beneficial to man (Fajemisin *et al.,* 2010). *Cajanus cajan* (Pigeon pea) is a grain legume of relatively low human preference and demand in Nigeria. It is mainly cultivated in the middle belt area as inter crops in cassava and / or yam plots. It grows wild in other parts of Nigeria where little is known of it as a food crop. Consumption of *Cajanus cajan* seeds is rare in cultivated areas and occurs only during scarcity of other conventional grain legumes like soyabean, groundnut and cowpea. Its seed is rich in crude protein (21-30%) and leaf contains 10-15% crude protein (Ahamefule *et al.,* 2000). A report has shown that large ruminant on *Cajanus cajan* pasture gained 0.7-1.25kg/day at carrying capacity of 1-3.75 cattle/ha with live weight gains of 200-500g/ha per year (Nene *et al.,* 1990). However, there is dearth of information on the best acceptable processed form of pigeon pea (*Cajanus cajan*) forage by WAD goats. Thus, this study was designed to evaluate the effect of sex on nutrient intake, nitrogen retention, weight gain and feed to gain ratio of West African goats fed cassava peels and C*ajanus cajan* hay supplemented with concentrate

MATERIALS AND METHODS

The research work was carried out at the Teaching and Research farm of the Federal University of Technology Akure (FUTA). Cassava peels were collected from cassava processing centres in Akure. The cassava peels were sun dried for 3-4 days to reduce the cyanide and moisture contents, while **t**he *Cajanus cajan* hay preparation was done by air-drying the harvested forage of 18 months old from established *Cajanus cajan* pasture for 3-4 days under tree-shade to preserve the green colour and nutrients. Four (4) experimental diets were formulated such that cassava peels was partially replaced with *Cajanus cajan* hay at 0, 25, 50, and 75% in diets A, B, C, and D respectively. The concentrate diet contained 25% brewer's grain, 40% wheat offal, 18% palm kernel cake, 15% maize offal, 1% bone meal and 1% salt. Twenty four (24) adult West African Dwarf goats of 2-3 years old and average weight of 13 ± 2.14kg were sourced from the goat flock of the Teaching and Research farm, FUTA. The goats were treated against ecto- and endo-parasites before the commencement of the study period. At the end of adaptation period of fourteen days, the goats were allocated based on body weights to the experimental diets. Six (6) goats (3 bucks and 3 does) were assigned to each of the four (4) experimental diets supplemented with the formulated concentrate in a 2x4 factorial arrangement in completely randomized design experiment. The two tested factors were; (1) sex (male and female) and (2) four experimental diets. The feeding trial lasted 63days (excluding thirty days of adaptation). All the goats were fed 300g per goat per day of the concentrate at 8:00 am followed by the experimental diets at the rate of 3% per body weight 2 hours later. Fresh water and salt lick were supplied *ad libitum.* Daily records of feed intake and remnant as well as weekly weight gain per goat were obtained. At the 7th week, the goats were transferred to metabolic cages, faecal and urine samples were collected for seven days after seven (7) days of acclimatization. Chemical analyses were carried out on the feed, faeces and urine for crude protein / nitrogen, crude fibre, ether extract, ash according to standard procedure of AOAC (2002). Feed intake, body weight gain and feed to gain ratio were determined from the data collected. All data obtained were subjected to analysis of variance (ANOVA) and the treatment means were compared using Duncan's Multiple Range Test (SAS, 1999) package.

RESULTS AND DISCUSSION

The nutrient composition (%) of the experimental diets fed to WAD goats is presented in Table 1. The results revealed that observed nutrient contents in *Cajanus cajan* hay, concentrate and experimental diets varied significantly (P<0.05) except the dry matter and gross energy contents. The dry matter (DM) content of the experimental diets ranged from 90.13% (diet A) to 92.81% (diet C). The DM of the formulated concentrate used as supplement was 90.46%. The DM of the *Cajanus cajan* hay used was 86.34%. The high DM values of diets A, B, C and D might be attributed to the maturity of the C*ajanus cajan* forage incorporated in the diets and the DM of the supplement was within the range of 86-92% as also reported by Bamikole *et al.,* 2001) who fed *Fiscus religiosa* to WAD goats. The crude

protein (CP) content of the experimental diets was significantly (P<0.05) different across the treatments and it increased with the level of inclusion of *Cajanus cajan* hay in the experimental diets. The crude protein content ranged from 5.51% (diet A) to 16.10 (diet D). The CP of formulated concentrate supplement was 17.50% and CP of *Cajanus cajan* hay was 15.53%. The crude fibre (CF) content of the experimental diets increased with increased inclusion of *Cajanus cajan* hay in the diets and the highest value (28.52%) was observed in diet D. The CF of formulated concentrate used as supplement was 10.72%. The obtained values of fibre fractions: neutral detergent fibre (22.10 – 66.05 %), acid detergent fibre (22.00 – 41.71 %), acid detergent lignin (18.23 – 26.92 %), hemicelluloses (11.99 – 25.65 %) and cellulose (3.20 – 22.51 %) in this study agreed with the report of Alalade *et al.* (2012) when the nutritive quality and herbage yield of *Cajanus cajan* and native P*anicum maxicum* were evaluated.

Table 1: Chemical composition of *Cajanus cajan hay*, concentrate diet and experimental diets fed to West African Dwarf goats

Parameters	Diets						
	Cajanus cajan hay	Formulated concentrate	A	B	C	D	CV %
Dry matter	86.3	90.46	90.13	90.79	92.81	92.43	2.78
Crude protein	15.53^{a}	17.50^{a}	5.51^{d}	8.45^{c}	12.24^{b}	16.10^{a}	36.92
Crude fibre	30.55^{a}	10.72^{e}	15.51^{f}	18.21^{d}	22.40^{c}	28.52^{b}	34.54
Ether extract	1.80^{c}	8.78^{a}	3.50^{b}	3.01^{bc}	2.80^{bc}	2.50^{bc}	66.94
Ash	4.03^{c}	13.80^{a}	7.40^{b}	7.75^{b}	5.82^{bc}	5.05^{c}	50.75
Nitrogen free extract	34.79^{e}	49.20^{c}	58.21^{a}	53.37^{b}	49.55^{c}	40.26^{d}	17.24
Neutral detergent fibre	61.05^{a}	22.10^{d}	43.10^{c}	44.85^{c}	47.82^{b}	49.54^{b}	26.89
Acid detergent fibre	41.71^{a}	30.22^{b}	28.10^{b}	22.00^{c}	22.17^{c}	30.12^{b}	23.99
Acid detergent lignin	19.20^{c}	18.23^{c}	23.54^{b}	18.57^{c}	18.75^{c}	26.92^{a}	17.54
Hemiellulose	19.34^{c}	11.99^{e}	15.00^{d}	22.85^{b}	25.65^{a}	19.42^{c}	25.37
Cellulose	22.51^{a}	9.78^{b}	4.56^{c}	3.43^{c}	3.42^{c}	3.20^{c}	92.33
Gross energy (KJ/100gDM)	14.18	16.24	16.92	16.04	16.32	1 6.38	21.61

abcdef =means along the same row with different superscripts are significantly different (P<0.05)

Nutrients intake by WAD goats fed the cassava peels and *Cajanus cajan* hay supplemented with concentrate are presented in Table 2. The result revealed that the dry matter intake (DMI) by WAD goats fed the experimental diets was significantly (P<0.05) influenced by the treatment. The DMI values observed in this study were higher than those reported by Fajemisin *et al.* (2012) when chemically treated corncobs-based diets were fed to WAD sheep. The crude protein intake (CPI) of the goats ranged from 45.64g/day to 84.12g/day. The goats fed 25% cassava peels and 75% of *Cajanus cajan* hay supplemented with concentrate (diet D) consumed more protein than other goats fed other experimental diets. The crude fibre intake (CFI) ranged between 41.90g/day (diet A) and 100.99g/day (diet D) but were higher than the CFI reported by Fajemisin *et al.* (2012) when dietary effects of ensiled corncobs treated with or without water, lye and urea on performance characteristics of West African Dwarf sheep was evaluated. This study revealed that the effect of sex on nutrients intake depict no significant (P>0.05) difference but the female goats consumed more of the nutrients than the male goats. It is generally accepted principle that male animals consume more feed (nutrients) than female animals because of high metabolic rate and aggressive ingestive drive usually exhibited by male animals. However, the behavioural manifestation of the male goats can be considered, especially sexual behavior. The males have aggressive sexual behaviour towards the females and want to satisfy the urge for mating because they are in close proximity to the females (housed side by side and at visual contact with the females). This situation could have influenced the male goats to concentrate more on the females at expense of feeding.

For example, Aro and Adejumo (2011) while studying social relationship between male and female albino rats taken monogamy and polyandry into consideration, they discovered that the monogamous male consumed more feed and gained more weight than the polyandrous males. This is because the polyandrous males waste most of their time chasing the only female in their group instead of feeding.

Table 2: Nutrient intake by WAD goats fed cassava peels – C*ajanus cajan* hay supplemented with concentrate diet

Sources of variation			Dry matter	Crude protein	Crude fibre	Ether extract	Ash	Nitrogen free extract	Neutral detergent fibre	Acid detergent fibre	Acid detergent lignin	Hemi Cellulose	Cellulose	Energy
Sex		M	339.13	56.45	58.49	23.52	30.76	169.91	159.94	107.53	90.88	52.41	16.65	60.76
		F	369.61	62.26	63.44	26.07	32.11	185.81	174.07	117.16	82.63	56.91	35.80	66.25
		SEM	8.86	1.62	1.26	0.77	0.56	4.03	4.02	2.84	1.80	1.14	1.07	1.59
Diets		A	306.76^{b}	45.64^{c}	41.90^{c}	23.75^{b}	24.35^{b}	177.12^{b}	139.37^{b}	92.17^{c}	68.00^{b}	47.20^{c}	24.17^{b}	55.92^{a}
		B	318.90^{b}	50.66^{bc}	46.81^{c}	23.74^{b}	26.08^{ab}	171.60^{b}	146.70^{b}	96.45^{b}	70.61^{a}	50.25^{b}	25.84^{b}	56.94^{a}
		C	332.73^{b}	63.99^{b}	64.15^{b}	24.28^{b}	28.08^{ab}	180.50^{b}	155.88^{b}	99.45^{b}	73.30^{a}	56.43^{b}	25.84^{b}	59.29^{a}
		D	459.24^{a}	84.12^{a}	93.99^{a}	27.42^{a}	49.97^{a}	203.74^{a}	226.05^{a}	151.41^{a}	93.11^{a}	74.64^{a}	26.15^{a}	81.88^{a}
		SEM	12.52	2.94	1.78	1.09	1.76	6.97	3.71	4.01	2.54	1.61	1.49	2.24
	Diets	Sex												
Sex x Diets	A	M	273.81	39.58	37.87	20.69	23.79	151.88	124.72	84.22	61.21	40.50	23.01	49.99
		F	339.70	51.70	45.93	24.80	24.91	190.37	150.05	99.15	72.78	50.90	26.37	58.86
	B	M	303.69	47.68	45.03	22.16	26.16	162.65	140.00	91.34	67.57	48.66	23.77	54.21
		F	333.00	53.64	48.59	25.33	26.01	178.88	153.41	101.56	74.66	51.85	26.90	59.67
	C	M	332.33	56.53	53.39	23.81	26.71	171.47	155.23	99.03	73.03	56.20	26.00	59.21
		F	332.44	56.53	54.92	25.74	26.95	173.50	156.54	100.47	73.52	56.07	26.95	59.37
	D	M	446.49	82.02	96.13	27.43	46.36	194.66	201.87	130.40	100.25	71.47	30.15	79.65
		F	471.90	86.23	105.85	27.41	53.58	198.83	233.31	155.49	118.67	77.82	36.82	84.11
		SEM	14.36	3.33	5.01	0.67	1.07	6.11	7.37	5.22	4.55	2.88	1.03	2.52
		Sex	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		Diets	*	*	*	*	*	*	*	*	*	*	*	*
		Sex x Diets	*	*	*	*	*	*	*	*	*	*	*	*

abc=means along the same column and for the same parameter with different superscripts are significantly different (P<0.05).
M=Male F=female NS = Not Significant (P> 0.01). A, B, C, and D are experimental diets
*=Significan(P<0.05)

Table 3: Apparent digestibility coefficient of nutrients by WAD goats fed cassava peels – C*ajanus cajan* hay supplemented with concentrate diet

Sources of variation			Dry matter	Crude protein	Crude fibre	Ether extract	Nitrogen free extract	Neutral detergent fibre	Acid detergent fibre	Acid detergent lignin	Hemi cellulose	cellulose	Energy
Sex		M	61.86	64.69	73.59	61.92	78.84	62.46	68.54	67.24	61.67	68.08	61.25
		F	63. 11	68.06	69.32	67.42	79.73	67.22	68.63	69.80	72.97	63.98	65.45
		SEM	1.41	4.09	2.44	3.47	1.88	1.99	1.26	2.51	3. 14	5.23	1.69
Diets		A	52.82^{b}	58.34^{b}	51.93^{b}	58.55^{b}	72.75^{b}	52.45^{c}	51.75^{c}	60.85^{b}	59.23^{b}	52.46^{b}	54.28^{b}
		B	63.87^{a}	64.24^{ab}	74.61^{a}	60.46^{b}	81.21^{a}	65.05^{b}	69.54^{b}	65.91^{b}	65.02^{ab}	68.69^{b}	59.43^{b}
		C	65.58^{a}	64.97^{ab}	75.28^{a}	62.40^{b}	81.53^{a}	66.15^{b}	69.68^{b}	67.28^{b}	67.56^{ab}	69.16^{b}	59.98^{b}
		D	67.66^{a}	77.96^{a}	84.00^{a}	77.26^{a}	81.65^{a}	75.73^{a}	83.37^{a}	80.04^{a}	77.46^{a}	73.81^{a}	79.69^{a}
		SEM	2.00	5.78	3.45	4.91	2.66	2. 81	1.78	3.55	4.44	7.38	2.40
	Diets	Sex											
Sex x Diets	A	M	54.96	63.13	62.20	55.08	36.13	72.10	52.96	55.73	60.33	62.76	52.08
		F	50.69	53. 19	41.67	62.02	28.03	73.40	51.93	47.76	44.60	58.94	66.38
	B	M	59.77	63.03	77.43	54.62	49.54	74.48	58.48	65.91	67.81	60.90	56.00
		F	67.96	65.45	71.79	66.30	49.33	87.93	71.61	73.17	69.56	70.93	74.04
	C	M	62.68	53. 19	68.41	56.67	19.73	85.38	63.03	68.20	70.09	64.35	61.33
		F	68.48	76.75	82. 15	63.13	48.41	77.68	69.27	71.15	68.2	70.21	73.79
	D	M	65.30	76.51	81.68	73.22	42.99	79.90	75.38	82.42	73.53	79.13	77.28
		F	70.03	79.42	86.33	81.29	54.33	83.41	76.07	84.33	74.08	80.94	77.64
		SEM	1.58	3.14	3.16	2.76	2.97	1.60	2.22	2.53	3.60	2.19	2.68
		Sex	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
		Diets	*	*	*	*	*	*	*	*	*	*	*
		Sex x Diets	*	*	*	*	*	*	*	*	*	*	*

a,b c=means along the same column with different superscripts are significantly different (P<0.05) M= Male F= Female NS = Not Significant (P>0.01)

* =Significant (P< 0.05). A, B, C, and D are experimental diets

Table 4: Performance Characteristics of WAD goats fed cassava peels – C*ajanus cajan* hay supplemented with concentrate diet

Sources of variation			Initial weight (Kg)	Final weight (Kg)	Weekly weight gain (Kg)	Daily weight gain (g)	Feed/gain ratio	Nitrogen retention
Sexes		M	8.07	9.50	1.43	22.70	14.94	5.13
		F	10.61	12.48	1.87	29.68	12.46	6.10
		SEM	0.50	0.47	0.25	4.51	3.99	0.57
		A	9.60	10. 91	1.33	21.11	14.77	3.90[b]
Diets		B	9.23	10. 88	1.65	26.19	12.18	4.35[b]
		C	9.27	11.00	1.73	27.46	12.12	5.08[b]
		D	9.27	11. 15	1.88	29.84	15.39	9.18[a]
		SEM	0.70	0.67	0.36	6.38	5.64	0.81
	Diets	Sex						
Sex x Diets	A	M	8. 17	9.20	1.07	19.05	14.48	2.99
		F	11.03	12.63	1.60	28.57	15.08	4.83
	B	M	8.95	10.65	1.70	30.36	11.41	3.81
		F	9.50	11.10	1.60	28.57	13.17	3.84
	C	M	7.43	8.40	0.97	17.26	32.65	4.79
		F	11.10	13.60	2.50	44.64	13.01	5.94
	D	M	7.73	9.73	2.00	35.71	15.88	8.92
		F	10.80	12.57	1.77	31.55	15.23	9.94
		SEM	0.41	0.45	0.17	3.16	2.70	0.59
		Sex	NS	NS	NS	NS	NS	NS
		Diets	NS	NS	NS	NS	NS	*
		Sex x Diets	*	*	NS	NS	NS	*

abc=means along the same column with different superscripts are significantly different (P<0.05)
M= Male F= Female NS = Not Significant (P>0.01) * =Significant (P< 0.05).

The result of apparent digestibility of the diets by the goats is presented in Table 3. The digestibility of dry matter was noted to increase with increased quantity of crude protein intake by the goats fed the experimental diets. This observation agreed with the report of McDonald *et al.* (1995) that protein quality and intake enhance digestibility of feed. The crude protein digestibility was higher than the range of 56.2%-63.10% reported by Olorunnisomo (2010) for lambs fed cooked or fermented cassava-urea meal. The effect of sex on nutrients digestibility was obvious in female goats compared to the digestible coefficient of male goats. This observation might be attributed to the low feed intake by the male goats and consequent low nutrients intake which might reduced their nutrients digestibility. The weight gain, feed to gain ratio and nitrogen retention of West African Dwarf (WAD) goats fed the experimental diets supplemented with concentrate diet were as shown in Table 4. The sex effect on the daily weight gain was not significant (P>0.05) but the female goats gained more weight than the male goats. The result of dietary effect on daily average weight gain (g/day) of the goats revealed no significant (P>0.05) difference amidst the observed values that ranged from 21.11 (diet A) to 29.84 g/day (diet D), it implies that any of the experimental diets could be fed to improve the weight gain of the goats. The effect of interaction between sexes and diets on the weight gain of goats shown no significant (P>0.05) difference but the female goats fed diet C gained more weight (44.64 g/day) compared to other goats. The effects of sex, diets and interaction between sex and diets on feed to gain ratio were as shown in Table 4, the feed to gain ratio favoured the goats fed diet C which had feed to gain ratio value of 12.12. The nitrogen retention observed in this study ranged from 3.81 to 9.94 g/day, this was higher than the values (1.97 to 8.05%) reported by Olorunnisomo (2010) for sheep fed cooked or

fermented cassava – urea meal. The effect of sex on nitrogen retention was not significant (P>0.05) however, the female goats retained more nitrogen than the males. This observation might be attributed to high crude protein intake by the female goats (Table 2). The nitrogen retention was significantly (P<0.05) influenced by the treatment, the goats fed diet D had the highest value (9.18 g/day) compared to 3.90 g/day observed in goats fed the control diet. The interactive effect of sex and diets on the nitrogen retention was significant (P<0.05), the female goats fed diet D had the highest nitrogen retention value compared to male goats fed diet A. This is an indication that the protein in the diet D was available to the goats with less faecal and urinary nitrogen loss.

CONCLUSION

The results obtained from this study revealed that cassava peels substituted with *Cajanus cajan* hay and supplemented with the formulated concentrate no doubt improved the crude protein of the diets, nutrients intake and utilization by the goats. The substitution of cassava peels with *Cajanus cajan* hay at 25% and 75% (Diet D) supplemented with concentrate was more acceptable and tolerable to the WAD goats. It also supported appreciable dry matter and crude protein intake, nutrients digestibility, weight gain, feed conversion and nitrogen utilization which had positive effect on the female goats than the male goats and any of the feed could be fed to enhance the growth performance of the goats.

CONFLICT OF INTEREST

The authors agreed to the publication of this article without any conflict of interest whether personal, financial or otherwise

REFERENCES

Ahamefelu, F.O., Ibeawuchi, J.A and Ahunam, U.C 2000. Intake,digestibility and nitrogen balance studies in WAD goats fed Cassava peel-leaf meals. Proc. Nig. Soc.Anim.Prod.25:71-72

Alalade, J.A, Akingbade, A.A., Akinlade, J. A., Akanbi, W.B., Aderinola, O.A., Asaolu, V.O., Oyadeyi, O.S. and Adaramola, K.A. 2012. Effect of number of *Cajanus cajan* rows on herbage yield and nutritive quality of native *Panicum maximum.*. Proc.17th Annual Conf. Nigeria Society of Animal Production. Abuja, Nigeria.Pp. 550-553.

AOAC. 2002. Official Methods of Analysis. 17thedition. Association of Analytical Chemists Washington. D.C.Pp 275-293.

Aregheore, E.M, Makkar, H.P.S and Becker, K. 1998. Feed value of some browse plants from the Central Zone of the Delta State, Nigeria. *Tropical Science* 38 (2) pp 97-104.

Aro, S.O., Aletor, V.A., Tewe, O.O., Fajemisin, A.N., Usifo, B. and Falowo, A.B. 2008. Preliminary investigation on the nutrient, anti-nutrients and mineral composition of microbially fermented cassava starch residues. *Proceedings of 33rd Annual Conference of Nigerian Society for Animal Production* held at Olabisi Onabanjo University, Aiyetoro, Ogun State, Nigeria. March 16-20th 2008. pp 583-586.

Aro, S.O and Adejumo, D.O. 2011 Influence of monogamy and polyandry on body weight change and gonadal morphomentry of the male albino rats.Journal of Sustainable Technology, 2 (1): 107-113

Bamikole, M.A., Babayemi, O.J., Arigbede, O.M. and Ikhatua, U.J. 2001. Nutritive value of *Fiscus religiosa* in WAD goats. *Animal Feed Science and Technology* 105 (4): 71-79.

Fajemisin, A.N., Alokan, J.A., Aro, S.O., Alowofeso, O. and Fawolu, T.S. 2010. Nutrient intake, Digestibility and weight gain of West African Dwarf sheep fed rumen content-poultry droppings mixed diets. Proceedings of .33rd Annual Conf. *Nigeria Society of Animal Production. Pp.583-586.*

Fajemisin, A.N., Chineke, C.M., Fadiyimu, A.A., Fajemisin, A.J. and Alokan, J.A. 2012. Dietary effects of ensiled corncobs treated with or without water, lye and urea on performance characteristics of West African Dwarf sheep. *Proceedings of 17th Annual Conference of Animal Science Association of Nigeria (ASAN)* held at International Conference Centre,

Opposite Radio House, Area 8, Abuja, (FCT), Nigeria. September 9-13th 2012. pp. 575-578.

Fajemisin, A.N., Olomola, O.A., Fadiyimu, A.A. and Alokan, J.A. 2013. Nutrients digestibility and nitrogen retention by West African Dwarf goats fed cassava peels, *Cajanus cajan* hay and concentrate supplement. *Proceedings of 38th Annual Conference of Nigerian Society for Animal Production* held at River State University of Science and Technology, Port Harcourt, Nigeria. March 17-20th 2013. pp. 332-335.

McDonald, P., Edward, R.A., Grenhalgh,J.F.D. and Morgan, C.A. 1995. Animal Nutrition. 5th edition.Pearson Educational Limited, Edinburg gate, 9arlow Essex CM20 2JE, United Kingdom. Pp 102 - 110

Nene, Y.L., Hall, Susan, D. and Sheila, V.K. 1990. The Pigeonpea. (CAB International Crops Research Institute for Semi-Arid Tropics, India. Pp 23-30

Olorunnisomo O.A 2010. Utilization of raw cooked or fermented cassava-urea meal total diet for growing ewe-lambs. *Nigeria Journal of Animal production* 37 (2): 237-246.

SAS. 1999. SAS User's Guide.Statistical Analysis System Institute. Inc. Cary.