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Growth Indices and Carcass Quality of WAD Goats Fed Raw Cashew Nut Shell Diets

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ABSTRACT

In a sixty three day feeding trial, twenty (20) West African Dwarf (WAD) goats with an average weight of 6.74 ± 0.33 kg were used to evaluate the effect of feeding raw cashew nut shell (RCNS) on growth and carcass characteristics of the animals. The goats were randomly allotted to four (4) dietary groups containing RCNS at 0% (diet A), 5% (diet B), 10% (diet C) and 15% (diet D) with five (5) goats per group. The raw cashew nut shell was sun-dried and crushed to less than 1 mm particle size. The animals were weighed on weekly basis to determine their weight gains. The chemical composition of the diets were also determined. At the end of the feeding trial, three (3) experimental animals from each treatment group were sacrificed and dissected to investigate the whole sale cut, relative organ weight and carcass yield. The organs were collected in a cleaned and labeled bottles containing 10% formalin buffer solution. The weight of whole sale cuts was determined by cutting their respective parts and weighing. The meat: bone ratio was determined by clearly separating the flesh from the bones for each carcass. The flesh and bone was weighed separately and the ratio of the two was determined. Results showed that raw cashew nut shell significantly ($P < 0.05$) influenced the dressing weight, slaughtered weight and meat: bone ratio. Goats fed diet B had the highest meat: bone ratio (3.21). Wholesale cuts revealed that there was no significant ($P > 0.05$) difference in all the parameters determined except in the thigh while the result of the relative organ weight showed significant ($P < 0.05$) difference. Goats fed diet B also had the highest weight gain (3.90kg) and best feed gain ratio (6.50). It can be concluded that up to 5% inclusion level of raw cashew nut shell in the diets of WAD goats improved their growth.

Keywords: West African Dwarf goat, cashew nut shell, carcass, wholesale cut

Introduction

The increasing world population has placed a higher demand on animal protein in the world market, more so that meat consumers today prefer lean meat that will meet specifications and this will solely depend on the carcass composition of the animal (Bruce McGregor, 2007; Kalio, 2018). However, studies have revealed that there is a general dearth in animal protein supply in the tropics (Okai *et al.*, 2005). It is therefore important to ensure the production system that would use maximum quantity of non-conventional feed stuff in goat diets for better carcass yield. Some non-conventional feed stuff of crop origin also referred to as crop by-products which are readily available and inexpensive can be utilized by small ruminant farmers during times of feed scarcity

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(Kalio *et al.*, 2014). An important class of non-conventional feed stuff in Nigeria which is cheap, readily available, and nutritionally adequate and not in direct use by humans is cashew nut shell which is a by-product of the cashew nut processing factory. It is the left over after cashew kernel have been removed from the shell (Ocheja *et al.* 2011). This cashew "drupe" is made up of outer, hard shell and inner edible kernel of which cashew tree leaf and cashew nut shell (CNS) is among the widely cultivated fruits in Southern and Western Nigeria, Brazil and coast of Mozambique (Araya *et al.*, 2003). Although cashew was introduced into Nigeria more than 400 years ago, extensive cultivation started only in the early 1950's. From 1965 to 1990, cashew production was relatively static at 25,000 tonnes with estimated land area of 50,000ha in 1990. Currently, cashew cultivation has spread to about 27 states of the country and in the past 12 years, production has increased almost thirty-fold from 30,000 MT in 1990 to 836,500 MT in 2012 from estimated land area of 366,000 ha (FAOSTAT, 2013). The cashew nut shells (CNS) are usually heaped in refuse dump, farm lands and sometimes near homes. They usually constitute nuisance to the environment and are rarely relished by ruminant animals. They have a high concentration in tannins and prussic acid, which explains the low values observed for dry matter intake and digestibility in goats (Reddy *et al.*, 2008). Cashew nut shell is also composed of a toxic phenolic resin, urushiol; a potent caustic skin irritant toxin which therefore should be eliminated. Cashew nut shell (CNS) in spite of their limitations could be recycled and used as a source of valuable lignocelluloses biomass for animals, thereby reducing the cost of animal protein and making it more affordable. The thrust of this study was to investigate the growth performance and carcass quality of WAD goats fed raw cashew nut shell.

Materials and methods

Experimental Site: The experiment was carried out at the Sheep and Goat Unit of the Teaching and Research Farm of the Federal University of Technology, Akure, Ondo State, Nigeria. Akure is located on longitude 4.944055ºE and 5.82864ºE, and latitude 7.491780ºN with annual rainfall ranging between 1300 and 1650mm and annual daily temperature ranging between 27ºC and 38º C (Daniel, 2015).

Collection and Preparation of Experimental Diets

Composite cashew nut shell was obtained in Akure and its environs and also at the cashew plot of Cocoa Research Institute of Nigeria, Ibadan. It was sun-dried for 12 days due to the intensity of the sun and was crushed to 1 mm particle size. The cashew nut shell was incorporated in a 4 complete diets at the rate of 0% (diet A), 5% (diet B), 10% (diet C) and 15% (diet D) respectively. Other ingredients added to the complete diets are presented in Table 1.

Table 1. Gross composition of raw cashew nut shell diets fed to WAD bucks

Ingredients (%)	T1	T2	T3	T4
RCNS	0.00	5.00	10.00	15.00
Cassava Peel Meals	50.00	45.00	40.00	35.00
Brewer Dried Grain	15.00	15.00	15.00	15.00
Wheat Offal	5.00	5.00	5.00	5.00
Palm Kernel Cake	27.00	27.00	27.00	27.00
Salt	1.00	1.00	1.00	1.00
Bone meal	1.00	1.00	1.00	1.00
Premix	1.00	1.00	1.00	1.00
Total	**100.00**	**100.00**	**100.00**	**100.00**

RCNS- Raw cashew nut shell

Experimental Layout and Animal Management

Twenty (20) WAD bucks of about 6 to 7 months of average weight of 6.74 ± 0.33 were randomly assigned to four dietary treatments of five replicate per treatment in a Completely Randomized Design. The goats' weight were balanced for weight and were placed in individual pens and offered fresh clean water. Prior to the commencement of the experiment, the WAD goats were vaccinated against PPR disease and treated against ecto-parasites. The goats were given daily ration at 3% of their body weight. *Panicum maximum* was given as basal diet along with experimental diets. The feeding trial lasted for 63 days excluding the 2 weeks of adaptation. All animals were cared for and managed according to the ethical approval and guideline of NENT, (2016).

Data and Sample collection

Growth response of the goats to the experimental diets were monitored by their initial body weights, followed by weighing on weekly basis prior to morning feeding. The feed offered to the goats was recorded and leftover was weighed daily to compute feed intake by the animals.

Carcass yield and relative organ weights measurement

At the end of the feeding trial, three (3) animals from each treatment were randomly selected, weighed and slaughter after 24 hours of feed and water withdrawal and their carcass parameters were evaluated as follows:

a. Organ weights: The experimental animals were slaughtered humanely and eviscerated. The organs such as the liver, lungs, kidney, heart, spleen and small intestine were collected into a labeled and cleaned bottles containing formalin buffer solution. Using a clean set of dissecting tools, these organs were collected into specimen bottles containing 10% formalin carefully according to standard method of collection described by Baker *et al.* (2006).

b. Whole sale cuts (Ribs, belly, neck, shoulder, back, head and thigh). The weights of whole sale cuts was determined by cutting their respective parts and weighed.

c. Carcass yield (slaughter weight, dressed weight, dressing percentage and meat to bone: ratio.) Dressing (%) was calculated using the formula

$$\text{Dressing Percentage} = \frac{\text{Dressed weight}}{\text{Live weight}} \times 100$$

The meat: bone ratio was determined by clearly separating the flesh from the bones for each carcass. The flesh and bone was weighed separately and the ratio of the two was determined.

Statistical analysis

Data obtained were analyzed using one-way analysis of variance (ANOVA) using statistical analysis software (SAS, 2001) and means were separated using the Duncan Multiple Range Test of the same package.

Results

Chemical composition of raw cashew nut shell diets fed to WAD bucks

The percentage chemical composition of raw cashew nut shell diet fed to WAD bucks is presented in Table 2. The dry matter (DM) content of the experimental diets ranged from 74.49% (diet A) to 82.87% (diet D). The crude protein (CP) content increased with increased inclusion of raw cashew nut shell. The highest CP value was recorded for diet D (7.89%) and diet A (7.16%) had the least. The Crude fibre (CF) content ranged from 22.45% (diet A) to 24.01% (diet D). The ether extract content of the diets ranged from 3.70% (diet D) to 3.94% (diet A). Ash content varied from 7.01% (diet D) to 7.34% (diet A). Diet A had the highest nitrogen free extract (59.32%) while diet D had the least (57.19%). The neutral detergent fibre (NDF) ranged from diet A (52.69%) to diets C and D (57.03%). The acid detergent fibre (ADF) ranged from diet C (24.90%) to diet A (34.81%).The acid detergent lignin (ADL) varied from 3.92% (diet D) to 8.16% (diet B). Hemicellulose ranged from 17.51% (diet B) to 32.13% (diet C). Cellulose content was highest in diet A (28.98%) and least in diet C (18.45%).

Table 2. Chemical composition of raw cashew nut shell diets fed to WAD bucks

Parameters	A (0%)	B (5%)	C (10%)	D (15%)	P-value
Dry matter	74.49 ±0.27^{d}	75.86 ±0.18^{c}	76.66 ± 0.09^{b}	82.87 ±0.09^{a}	0.00
Crude protein	7.16 ±0.00^{ab}	7.35 ±0.05^{ab}	7.84 ±0.20^{a}	7.89 ±0.15^{a}	0.02
Crude fibre	22.45 ±0.13^{ab}	23.16 ±0.05^{ab}	23.80 ±0.20^{a}	24.01 ±0.13^{a}	0.04
Ether extract	3.94 ±0.01^{a}	3.79 ±0.01^{ab}	3.75 ±0.10^{b}	3.70 ±0.02^{b}	0.05
Ash	7.34 ±0.23	7.28 ±0.25	7.25 ±0.07	7.01 ±0.09	0.11
Nitrogen free extract	59.32 ±0.16^{a}	58.61 ±0.30^{a}	57.36 ±0.03^{ab}	57.19 ±0.05^{ab}	0.00
Neutral detergent fibre	52.69 ±0.08^{b}	47.16 ±0.06^{c}	57.03 ±0.14^{a}	57.03 ±0.14^{a}	0.00
Acid detergent fibre	34.81 ±0.16^{a}	29.66 ±0.20^{b}	24.90 ±0.21^{d}	27.52 ±0.14^{c}	0.01
Acid detergent lignin	5.83 ±0.09^{c}	8.16 ±0.18^{a}	6.45 ±0.26^{b}	3.92 ±0.05^{d}	0.00
Hemicellulose	17.88 ±0.24^{c}	17.51 ±0.14^{c}	32.13 ±0.35^{a}	29.51 ±0.39^{b}	0.04
Cellulose	28.98 ±0.25^{a}	21.50 ±0.02^{c}	18.45 ±0.05^{d}	23.60 ±0.20^{b}	0.00

abc = means within the same row with different superscripts are significantly different (P<0.05).

Growth indices of WAD goats fed raw cashew nut shell diets

The growth performance of WAD goats fed raw cashew nut shell diets is shown in Table 3. All the parameters observed were all statistically (P < 0.05) influenced by the dietary treatment except for the initial weight. The final weight recorded ranged from 8.01 kg (diet D) - 10.80kg (diet B). The weight gain range from 1.15kg (diet D) to 3.90kg (diet B). The highest observed feed intake value was recorded in buck fed diet A (456.37 g/day) while the least was recorded in bucks fed diet D (207.69 g/day). Daily weight gain varied from 18.25 g/day (diet D) to 61.91 g/day (diet B). The feed gain ratio by goats fed diet B (6.50) was the highest.

Carcass yield of WAD goats fed raw cashew nut shell diets

The results of the carcass yield of WAD goats fed raw cashew nut shell diets is shown in Table 4. The result revealed that the inclusion of raw cashew nut shell in the diet significantly (P < 0.05) influenced the parameters determined except in the live weight and dressing percentage. The live weight ranged from 8.21 kg (diet D) to 8.59 kg (diet C) while dressed weight ranged from 3.61kg (diet D) to 4.14kg (diet B). Dressing percentage ranged from 42.61% (diet C) to 49.00% (diet B) while meat: bone ratio was highest in goats fed diet B (3.21) and least in goats fed diet C (2.47).

Table 3. Growth indices of WAD goats fed raw cashew nut shell diets

Parameters	A (0%)	B (5%)	C (10%)	D (15%)	P-value
Initial weight (kg)	6.67±0.34	6.90 ± 0.33	6.52 ± 0.33	6.86 ± 0.33	0.73
Final weight (kg)	10.12± 0.23^{b}	10.80 ± 0.14^{a}	8.20 ± 0.33^{c}	8.01 ± 0.33^{c}	0.00
Weight gain (kg)	3.45 ± 0.33^{a}	3.90 ± 0.34^{a}	1.68 ± 0.01^{b}	1.15 ± 0.003^{b}	0.00
Dry matte intake (g/day)	456.37±90.66^{a}	402.16±31.89^{a}	294.57±11.14^{b}	207.69±52.07^{b}	0.01
Daily weight gain (g/day)	54.76± 0.32^{b}	61.91 ± 0.40^{a}	26.67 ± 0.67^{c}	18.25 ± 0.66^{d}	0.00
Feed gain ratio	8.33 ± 0.32^{c}	6.50 ± 0.67^{c}	11.05 ± 0.34^{a}	11.38 ± 0.38^{a}	0.00

abc= means within the same row with different superscripts are significantly different (P < 0.05).

Table 4. Carcass yield of WAD goats fed raw cashew nut shell diets

Parameters	A (0%)	B (5%)	C (10%)	D (15%)	P-value
Live weight	8.36 ± 0.15	8.45 ± 0.12	8.59 ± 0.23	8.21 ± 0.07	0.12
Dressed weight (kg)	3.74 ± 0.04^{b}	4.14 ± 0.06^{a}	3.66 ± 0.01^{b}	3.61 ± 0.01^{b}	0.01
Dressing percentage	44.72 ± 3.18	49.00 ± 6.29	42.61 ± 0.16	43.97 ± 1.04	0.09
Meat: bone ratio	3.19 ± 0.21^{a}	3.21 ± 0.31^{a}	2.47 ± 0.24^{b}	2.53 ± 0.01^{b}	0.02

abc = means within the same row with different superscripts are significantly different (P< 0.05).

Whole sale cuts of WAD bucks fed raw cashew nut shell diets

The results of the whole sale cut of WAD goats fed raw cashew nut shell diets is presented in Table 5. The result showed that there were no significant (P > 0.05) difference in the parameters determined except in the thigh. Head weight ranged from 494.00g (diet C) to 616.00g (diet A). Neck weight ranged from 175.00g (diet C) to 342.50g (diet A). The highest observed value of the thigh was recorded in goats fed diet B (455.50g) and least in those fed diet C (201.00). The shoulder had the highest weight in goats fed diet D (159.00g) and had the least value in goats fed diet C (71.00). The highest observed ribs value was obtained in goats fed diet D (633.00g) and least in goats fed diet A (440.50g). Back weight ranged from 334.00g (diet C) to 564.50g (diet B). The arm had the highest weight in goats fed diet A (182.50g), and had the least values in goats fed diet D (103.50g). The belly weight in goats fed diet A are numerically the same (230.00g) with those on diet B, but the least value was observed in goats fed diet D (163.00g). Lumb weight was highest in goats fed diet B (121.00) while it was least in goats fed diet C (99.50). Hind limb weight ranged from diet C (98.50g) to diet D (136.00g)

Relative organ weight of WAD bucks fed raw cashew nut shell diets

Table 6 shows the results of the relative organ weight of WAD goats fed raw cashew nut shell diets. The results shows that the dietary substitution of raw cashew nut shell significantly (P< 0.05)

influenced the organs weight of the goats fed the experimental diet. Liver weight decreased with increased level of raw cashew nut shell in the diet; and ranged from 99.67 (diet D) to 152.00 (diet A). Kidney weight ranged from 23.00 (diet D) to 41.67 (diet B). The highest observed value of heart weight was recorded in diet B (50.67) and least in goats fed diet C (27.00). Goats fed diet B (103.00) had the highest value of lung weight while those fed diet C (66.00) had the least value. Spleen weight ranged from 5.67 (diet D) to 11.67 (diet A).

Table 5. Whole sale cuts of WAD bucks fed raw cashew nut shell diets

Parameters (g)	A (0%)	B (5%)	C (10%)	D (15%)	P-value
Head	616.00 ± 32.00	587.00 ± 84.00	494.00 ± 67.50	529 ± 21.50	0.507
Neck	342.50 ± 22.50	291.50 ± 88.50	175.00 ± 32.00	215.50 ± 22.50	0.220
Thigh	379.50 ± 105.50^{a}	455.50 ± 33.50^{a}	201.00 ± 18.00^{b}	215.00 ± 3.00^{b}	0.030
Shoulder	144.50 ± 1.50	130.00 ± 28.00	71.00 ± 14.00	159.00 ± 70.00	0.474
Ribs	440.50 ± 4.50	443.50 ± 106.50	509.00 ± 252.00	633.00 ± 305.00	0.896
Back	557.50 ± 69.50	564.50 ± 22.50	334.00 ± 114.00	426.00 ± 91.00	0.278
Arm	182.50 ± 15.50	179.50 ± 32.50	107.50 ± 20.50	103.50 ± 32.50	0.177
Belly	230.00 ± 34.00	230.00 ± 60.00	185.00 ± 5.00	163.50 ± 18.50	0.527
Lumb	119.00 ± 2.00	121.00 ± 11.00	99.50 ± 1.50	118.50 ± 10.50	0.303
Hind limb	133.00 ± 7.00	125.00 ± 7.00	98.50 ± 6.50	136.00 ± 20.00	0.236

a,b = means within the same row with different superscripts are significantly different ($P < 0.05$).

Table 6. Relative organ weight of WAD goats fed raw cashew nut shell diets

Organs (g)	A (0%)	B (5%)	C (10%)	D (15%)	P-value
Liver	152.00±2.89^{a}	172.00±7.51^{a}	114.00±15.01^{b}	99.67±2.60^{b}	0.00
Kidney	31.67 ± 2.03^{b}	41.67 ± 3.18^{a}	24.00 ± 2.89^{ab}	23.00 ± 1.73^{c}	0.01
Heart	49.67 ± 1.45^{a}	50.67 ± 6.64^{a}	27.00 ± 0.58^{b}	32.67 ± 0.33^{b}	0.02
Lung	91.00 ± 1.15^{a}	103.00±11.54^{a}	66.00±4.62^{b}	82.00±2.30^{ab}	0.01
Spleen	11.67±0.89^{a}	10.67±2.60^{a}	7.00 ± 0.58^{ab}	5.67 ± 0.33^{b}	0.05

abc = means within the same row with different superscripts are significantly different ($P < 0.05$)

Discussion

Chemical composition of raw cashew nut shell diets fed to WAD bucks

The chemical composition of raw cashew nut shell (RCNS) presented in Table 2 showed that dry matter (DM) increased with increasing inclusion level. RCNS dry matter was within the range (71.5 – 74.3%) reported by Adeyeye *et al.* (2007) and the values were still in the normal range for ruminants. The crude protein (CP) content of the diets increased with increased supplementation of raw cashew nut shell (CNS). This implied that the protein (7.16 – 7.89%) contribution from cashew nut shell improved the CP of the diet. The CP was higher than the range (5.00 – 6.05%)

obtained by Ocheja *et al.* (2011); Ocheja *et al.* (2016) where steam-treated cashew nut shell was fed to WAD goats. The recorded crude protein were above the 7% CP recommended by McDonald, (1995) to enact the activities of the rumen microbes and for maintenance of the animal. The crude fibre increased gradually with increased inclusion level of raw CNS. This might be due to the high lignocellulosic content of the raw cashew nut shell meal. Ether extract decreased with increased inclusion of raw CNS and this implied that the energy density of the feed is low. The ash content of the diets were higher than the 0.95 - 1.09% reported by Ocheja *et al.* (2011). High ash content might be due to silica content and even the debris of dead microorganism (McDonald, 1995; Ogunjemite and Ibhaze, 2020). The high neutral detergent fibre (NDF) implied that the cell wall of cashew nut shell might be rich in pectin which can be totally digested in the digestive tract of small ruminant.

Growth indices of WAD goats fed raw cashew nut shell diets

Goats fed diet B (5% inclusion level of raw cashew nut shell) had the highest weight gain as shown in Table 3; this may be as a result of the palatability, protein quality of the feeds, and microbial protein available for the goats which stimulate high intake. This was in agreement with the findings of Adebowale and Taiwo (1996); Fajemisin *et al.* (2013) that weight gain is dependent on the dry matter, protein intake and digestibility of the nutrient. This observation could be attributed to the improved nitrogen content of the diet which had improved microbial population in the rumen and also improved energy-nitrogen ratio, hence, an improved growth of the goats (Arigbede *et al.*, 2006; Fajemisin *et al.*, 2010). More so, the goats fed diet E had the highest nitrogen balance level. However, goats fed diet B also had the best feed/gain ratio than all other goats fed the experimental diets which implied that goats fed diet B best utilized the feed for meat prodution.

Carcass yield of WAD goats fed raw cashew nut shell diets

The values obtained in this study were significantly ($P < 0.05$) influenced by the inclusion levels of raw cashew nut shell in the diets except in the live weight and dressing percentage. This corroborated the findings of Ocheja *et al.* (2016) in a study where WAD goats were fed graded levels of steam-treated cashew nut shell. The dressing percentage (42.61 – 49.00%) in this study were higher than the range (43.80 - 47.30%) reported by Ukanwoko *et al.* (2009), when they fed West African dwarf goats with cassava leaf- meal based diets. The higher dressing percentage in this study may be as a result of the included internal organs such as heart, kidney, lungs, spleen and liver in the dressed carcass. Dressing percentage can be influenced by many factors such as fleece and hide weight alimentary trait size and fill, slaughtering procedure and portioning of body fat (Rotta *et al.*, 2009). It has also been demonstrated that carcass traits including dressing percentage are influenced by several factors such as plane of nutrition, sex, age of the animal, breed (Dhanda *et al.*, 2003); (Sebsibe *et al.*, 2007) and difference in gut fill at slaughter as reported by Talton, (2011) and McGregor (2012). Also the dressing method can be a factor that affects the dressing percentage because parts which are considered as offal may not be considered as offal in

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some other dressing methods. Fasae *et al.* (2007) reported hot carcass weight to be carcass weight that includes head, gastro intestinal tract but minus legs. Whereas, Ukanwoko *et al.* (2009) reported warm carcass weight to exclude visceral and abdominal fat and all internal organs. Goats fed diet B had the highest meat: bone ratio (3.21) indicating that diet B had the best utilization of feed for meat production. This corroborates the feed gain ratio observed in the growth study.

Whole sale cuts of WAD bucks fed raw cashew nut shell diets

The whole sale cuts of WAD bucks fed raw cashew nut shell is shown in Table 5. The result showed that there was no significant ($P > 0.05$) difference in the weight of WAD bucks fed the experimental diets except in the thigh, though values obtained in other parameters differs numerically. This agreed with the findings of Kalio and Amadi, (2018) that reported no significance difference in whole sale cuts of WAD goats fed diets incorporated with different nonconventional feed stuff. It was observed that the increase in weights of the relative whole or retail parts in some treatment were not concomitant with their carcass weights, hence an animal may have a higher carcass weight but may not have a corresponding increase in weight of some of its whole or retail parts. This is in agreement with the findings of Omojola and Attah, (2006) while investigating the carcass and non – carcass components of WAD bucks slaughtered at different weights who observed the highest relative weight of neck at 10 kg slaughter weight as compared to those slaughtered at 15 and 20 kg slaughter weight. The highest right thigh value (455.50g) observed in diet B suggests that goats fed diet B best utilized the feed for muscle build up and hence meat production. This agreed with the report of Ocheja *et al.* (2016) who reported a similar account in evaluation of carcass characteristics of growing WAD goats fed diets containing graded levels of steam-treated cashew nut shell.

Relative organ weight of WAD goats fed raw cashew nut shell diets

The weight of the liver, kidney, heart, lungs and spleen were significantly ($P < 0.05$) different but values did not follow any definite trend for all the organs considered. The significant values for all the organs considered is an indication that the raw cashew nut shell diets influenced the weight of the organs. Internal organs such as liver and heart would vary by enlargement if the diets contained poisonous substances (Ocheja *et al.,* 2019). The significant ($P < 0.05$) difference obtained in this study is at variance with the findings of Okpanachi *et al.* (2016) who recorded no significant differences with yearling WAD goats fed graded levels of cashew pulp meal based diets. However, they recorded significant differences in the weights of the organs when they fed cassava peel meal based diets supplemented with African yam bean concentrate. This observed discrepancies could be traceable to differences in the diets fed to the goats.

Conclusion

From the findings of this study, it could be concluded that feeding raw cashew nut shell at 5% inclusion level enhanced the growth of WAD buck, gave higher carcass yield and dressing percentage without any deleterious effect on their health status.

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