

GROWTH PERFORMANCE AND CARCASS CHARACTERISTICS OF RED SOKOTO BUCKS FED COWPEA HAY AND TWO CULTIVARS OF SWEET POTATO VINE

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ABSTRACT

This study evaluated the effect of feeding two cultivars of sweet potato vines (*Danchina* and *King J*) and Cowpea hay (serving as control diet) on the growth performance and carcass characteristics of Red Sokoto bucks. Twelve bucks were assigned into three dietary treatments; CH (Cowpea hay), DC (*Danchina*) and KJ (*King J*) in a randomized complete block design with four animals per treatments. The result obtained indicated that bucks from the treatment fed *King J* sweet potato vine cultivars had higher feed intake (988.66g/day) followed by *Danchina* (906.66g/day) and the least were the Cowpea hay (883.33g/day). There were significant ($P < 0.05$) differences between the dietary treatment in terms of empty body weight, cold carcass weight and real dressing percentage. Bucks fed *Danchina* and *King J* sweet potato vine cultivars had significantly higher rumen contents, lungs and kidney. It is concluded that *Danchina* and *King J* sweet potato vine cultivars can be fed to animals as a replacement for cowpea hay since they were proven to be nutritionally good for enhanced growth performance and carcass characteristics of the experimental animals.

Key words: Red Sokoto; Growth; Carcass; Sweet potato; Cowpea hay

INTRODUCTION

Goats provide over 1.9 million tonnes of meat annually representing 3.5% of the total world meat production and 8.5% of the total estimated meat production in developing countries (Ozung *et al.*, 2011). In Nigeria, goat meat contribution to total meat production as at 2006 was put at 147,360 metric tonnes (FAOSTAT, 2010). Goat meat is a good source of protein and having health benefits when is consumed in appropriate portions (Johnson *et al.*, 1995). Increasing feed costs and the need for diets based on locally available feedstuffs has shifted animal nutrition studies to unconventional feedstuffs for ruminants (Lashkari *et al.*, 2013). Considerable quantities of crop residues by uncommon agro-industrial are generated every year in most developing countries in the tropics and subtropics. Therefore, there is a growing interest in most countries to use the low cost alternative feedstuff sources for animals. One of such alternative feedstuffs is the potato vine that remains green for a long period. Potato is one of the five most important food crops in developing countries. Consequently, a huge amount of potato vine (plant residues after harvest) are produced and left over after harvest. It has been estimated that around 12,000 tons of dried potato vine are produced annually in the western parts of Iran (Hamedani *et al.*, 2011). Traditionally, potato has been grown exclusively for the production of the tubers and the vines have been considered as a waste by-product and therefore thrown away. Thus, vines could be fed to livestock, whereas the tubers are used for human consumption (Karachi, 2008). This study was therefore carried out to determine the growth performance and carcass characteristics of goats fed cowpea hay and sweet potato vine cultivars.

MATERIALS AND METHODS

Experimental site

The feeding trial was carried out at the Livestock Teaching and Research Farm of the Faculty of Agriculture, Bayero University, Kano.

Management of the animals and the experimental design used

Twelve bucks were used for the experiment laid in a randomized complete block design. Two varieties of sweet potato vines (*King J* and *Dan China* vines) and Cowpea hay were the forage

sources of the basal feed given to the animals. The supplemented feed was also offered to the animals. The ratio of forage to concentrate 60:40 was given. The quantities of the ingredients used in formulating the supplements are represented in Table 1. The vines were given in the morning and supplemented with the concentrate in the afternoon.

Table 1: Gross Composition of the Experimental Diets

Feed Ingredients (%)	Cowpea hay	Danchina	King J
Maize	03	24	09
Wheat offal	30	14	22
Cowpea husk	20	07	15
Groundnut cake	07	28	21
Rice bran	12	10	10
Rice milling waste	26	15	21
Salt	02	02	02
Total	100	100	100

Feed intake and growth performance

The experiment lasted for 60 days after an adaptation period of two weeks, daily feed intake (g/day) was recorded, and it was obtained by subtracting the feed left over from the feed offered while the growth performance was determined by weighing (kg) the animals at the beginning of the experiment and subsequently on weekly basis.

Animal slaughtering and carcass measurement

At the end of the feeding trial, the animals were subjected to twelve hours fasting. They were slaughtered by the severance of carotid arteries and the jugular veins. After slaughter, the heads were removed at the atlantico-occipita. Carcass and non-carcass components were weighed immediately after slaughter. The heart, liver, kidney and lungs were weighed separately. The non-carcass components such as head, skin and feet were also separately weighed and expressed in kilogram.

Calculations and statistical analysis

Empty body weight was calculated as the difference between bodyweight before slaughter and the weight of the digestive contents. The data collected on the growth performance and carcass characteristics were subjected to analysis of variance (ANOVA) SPSS (2007) statistical package. Least Significant Difference (LSD) was used to separate means at 5% level of probability.

RESULTS AND DISCUSSIONS

Growth performance

The growth performance characteristics of the Red Sokoto bucks fed two cultivars of the sweet potato vines and cowpea hay are presented in table 2. From the results obtained the experimental animals consumed *Danchina* and *King J* cultivars more than the cowpea hay (control). There were no significant ($P>0.05$) differences in the initial live weight of the animals which revealed some level of homogeneity. But, the final weight of the bucks placed on cowpea hay averagely gained 0.82kg which was comparable to those assigned on *Danchina* (0.86kg) and *King J* (0.84kg) dietary treatments. The body weight changes of the present study were lower than the gain (2.70-5.80kg) reported by Negesse *et al.* (2016) for grazing local goats supplemented with sweet potato vines. Live weight at slaughter, weight gain and average daily weight gain followed similar trend as the final weight gain. Therefore, bucks fed *King J* and *Danchina* vines recorded higher weight changes than the control. The average daily gain of 49.01 to 50.59g/day observed in this study was lower than those reported by Johnson *et al.* (2010) and Yusuf *et al.* (2014) whose findings revealed average daily gains of 81.86g/day and 103.18 to 173.43g/day for bucks fed grains and diets containing leaves or whole part of *Andropogon paniculata* respectively but is in conformity with the value (49.61g/day) recorded by Johnson *et al.* (2010) for goats fed forages. The differences in the values may be due to variations in the nutrients contents of the diets, breed of animals and the management system. There was no significant ($P>0.05$) difference in the average daily feed intake values observed in this study. Animals offered *King J* vine had the highest (988.66g/day) followed by the bucks fed *Danchina* (906.66g/day) while animals fed cowpea hay had the least (883.33g/day).

Table 2: Growth Performance of Red Sokoto Bucks Fed Sweet Potato Vine Cultivars

Parameters	Treatments			S.E
	CH	DC	KJ	
Initial weight(kg)	21.14	21.09	22.55	2.34
Final weight (kg)	21.96	21.95	23.39	2.29
Weight gain (kg)	0.82	0.86	0.84	0.07
ADG (g/day)	50.59	49.01	49.73	4.44
Average feed intake (g/day)	883.33	906.66	988.66	147.43
DMI (g/day)	831.33	893.33	916.00	70.08

ADG= Average Daily Gain; DMI= Dry Matter Intake; CH= Cowpea hay; DC=Danchina; KJ=King J; S.E=Standard error Table 3: Carcass Characteristics of Red Sokoto Bucks Fed Sweet Potato Vine Cultivars

Table 3 shows the result of the carcass evaluation of the experimental animals. Empty body weight, cold carcass weight and real dressing percentage differed ($P<0.05$) among the treatment diets. The highest empty body weight, cold carcass weight and real dressing percentage were presented by the bucks fed *King J* vine followed by *Danchina* vine and the least is Cowpea hay. The result of the present study was not in agreement with what was obtained by Katongole *et al.*, (2009) and Megersa *et al.* (2012) when Sidama goats were offered diets supplemented with sweet potato vines. This might be due to the mode of the feeding employed in the experiments. Results from the present study with higher dressing percentage agrees with the assertion of Alemu *et al.*(2010) who opined that supplementation with concentrate diets improved carcass characteristics of animals. Megersa *et al.*(2012) observed that goats fed diet of high crude protein content resulted in higher empty body weight when compared with those fed low crude protein content which is consistent with the current study. However, Anya *et al.* (2018) reported lower empty body weight in West African dwarf goats fed cassava peel diets supplemented with Yam bean concentrate. The dressing percentage values observed in this study were not within the range of 40.26-48.14% and 44.20-49.40% reported by Yusuf *et al.* (2014) and Negesse *et al.* (2016) respectively. Results from the current study with higher dressing weight may be due to inclusion of some visceral organs in its determination.

The weight of skin, head, feet, heart, lungs, liver and kidneys were significantly different ($P<0.05$) between the dietary treatment. This is because the bucks were slaughtered at different live weights. This result is not in consonance with that of Ayeb *et al.* (2015) who reported no significant differences in the weight of skin, head, feet, heart, lungs, liver and kidneys in the bucks fed local resources. The weight of the rumen content was significantly ($P<0.05$) affected by the sweet potato vine cultivars. It was higher in bucks receiving sweet potato vine cultivars (*King J* and *Danchina*) than the Cowpea hay. This tendency is related to feed intake level (Atti *et al.*, 2006) being much higher for sweet potato vine cultivars group (988.66 and 906.66g/day vs 883.33g/day).

Table 3: Carcass evaluation of the experimental animals

Parameters	Treatments			S.E
	CH	DC	KJ	
SLW (kg)	20.89	20.93	22.40	1.60
EBW (kg)	18.60 ^a	18.97 ^a	20.11 ^b	1.38
Warm carcass (kg)	10.17 ^b	10.65 ^b	12.08 ^a	0.05
Dressing percentage (%)	48.68 ^b	50.88 ^b	53.93 ^a	2.16
Skin (kg)	1.17 ^b	1.71 ^a	1.67 ^a	0.17
Head (kg)	1.43 ^c	2.18 ^a	1.83 ^b	0.22
Feet (kg)	0.55 ^b	1.02 ^a	0.95 ^a	0.15
Heart (kg)	0.09 ^b	0.10 ^b	0.12 ^a	0.09
Lungs (kg)	0.17 ^b	0.22 ^a	0.21 ^a	0.02
Liver (kg)	0.39 ^b	0.37 ^b	0.46 ^a	0.03
Kidney (kg)	0.09 ^b	0.09 ^b	0.13 ^a	0.01
Rumen Content	1.75 ^c	2.02 ^b	2.41 ^a	0.19
Small Intestine	0.67 ^a	0.49 ^b	0.62 ^a	0.05
Large Intestine	0.16 ^b	0.37 ^a	0.37 ^a	0.07

SLW= Slaughter Live weight; EBW=Empty body weight; CH= Cowpea hay; DC=Danchina; KJ=King J; S.E=Standard error

CONCLUSION

It is concluded that *King J* and *Danchina* sweet potato vine cultivars can be fed to animals as a replacement for cowpea hay since they were proven to be nutritionally good for enhanced growth performance and carcass characteristics of the experimental animals.

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