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Carcass and Non-carcass Traits of Local Rabbits Fed Different Sources of Fodder in Sudan

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ABSTRACT

The experiment was conducted to evaluate the effects of feeding Sweet potato on Carcass and non-carcass traits of local rabbits in Sudan. Twenty seven weaner rabbits at average weight of 400-500 g and average age of 45 days were used. Animals were randomly divided into three groups. Each group was fed a separate ration formulated either on Lucerne (Barseem) (ration A), sweet potato (*Ipomoea batatas*) (ration B) or *Clitoria ternate* (ration C) for a whole month. Treatment effect was not significant ($p>0.05$) in all parameters. Group C (*C. ternate*) performed the highest values for fore leg and shoulder (50.67±7.02) while group B (*I. batatas*) showed the highest values for loin (118.33±9.29), ribs (59.24±0.46) and hind leg and rump (98.29±2.90). Group B (Sweet potato) recorded the highest values for all parameters as percentages, group C (*C. ternate*) ranked second in all parameters and the control group conversely gave the lowest values.

Key words: *Clitoria ternate*, liver, lucerne, sweet potato

INTRODUCTION

Rabbit meat is highly valued for its nutritional and dietary properties it is a lean meat with a low fat content and less saturated fatty acids and cholesterol than other meats (Hernandez, 2008). Rabbits in Sudan are kept mainly in backyards of houses and intensive rabbit farming systems has not yet been developed (Elamin, 1979). This may be due to availability of other red meat sources. However, rabbits may provide additional source of white meat to poultry especially during the global fear of avian influenza outbreaks. In Sudan, rabbits are kept mainly in the backyards of houses and being reared as small-scale business (Elamin *et al*., 2011). The major rabbit breed in the Sudan is the Baladi (local type) which has low production potential. The main feed for local rabbits in Sudan is lucerne (*Medicago sativa*), supplemented with kitchen remains (Elamin, 1979). This is not a sufficiently nutritious diet for high levels of production and much work is needed to formulate suitable diets from local feed stuffs. Other protein sources were being used all over the world like *C. ternate* mulberry leaves and sweet potato (*I. batatas*) vines (Hue and Preston, 2006; Inthapanya and Preston, 2009; Tam *et al*., 2009). To improve quality, dressing percentage and the proportion of valuable body parts of growing rabbits need to be increased. Slaughter value varies according to breed, nutrition, keeping conditions, body weight and some other important factors (Rudolph, 1988). The objective of this study was to investigate the effects of feeding sweet potato (*I. batatas*) on carcass and non carcass traits of rabbits as compared to feeding of lucerne (*Medicago sativa*) and *Clitoria* (*C. ternate*).

MATERIALS AND METHODS

The experiment was conducted within the premises of Extension and Rural Development Centre, Faculty of Animal Production Elmanagil, University of Gezira, Sudan. Twenty seven, 45 day-old, clinically healthy local Baladi rabbit weaner with an average initial weight 400-500 g were used. Three dietary treatments in such a way, that age, sex and group weights were balanced as much as possible. At age of two months they were kept in a separate pen and randomly divided into three groups each of nine rabbits and divided into subgroup each of three rabbits. The animals were allowed 7 days adaptation period before the start of the experiment. All the cages had been equipped with feeders and drinkers.

A small animal house 3×6 m was shaded with corrugated zinc sheets, secured all round with a mesh-wire over a half meter brick barrier and adequately ventilated was used. The house was divided into ten compartments each of 1×1 m. The concrete floor was sand bedded and each compartment was equipped with a cement block shelter and sufficient watering and feeding facilities.

Formulation of the experimental ration and its chemical composition were shown in Table 1 and 2.

Animal were weighed on the first day of the experimental feeding as initial weight and there after weekly to the nearest gram using a three kilogram balance. Weighing was made before morning feeding at 7:30 a.m. local time. Final weight was determined at the end of the feeding period.

Table 1: Percent experimental ration composition

Ingredients	A (berseem)	B (sweet potato)	C (*Clitoria*)
Sorghum	17	25	27
Wheat bran	30	21	20
Groundnut cake	9	14	10
Molasses	9	8	9
Groundnut hulls	23	17	19
Berseem meal	12	-	-
Sweet potato meal	-	15	-
Clitoria meal	-	-	15
C P (%)	16.06	16.07	16.06
Energy (ME Mcal kg^{-1})	10.00	10.05	10.04
Energy protein ratio	0.63	0.63	0.63

Table 2: Chemical composition (dry matter basis) of experimental ration

	Rations		
Component	A (berseem)	B (sweet potato)	C (*Clitoria*)
Dry matter	92.46	92.71	92.67
Ether extract	20.09	30.02	30.00
Crude protein	16.06	16.07	16.06
Crude fiber	23.03	19.07	21.01
Nitrogen-free extract	42.05	47.04	46.08
Ash	70.01	60.07	50.08
ME mJ kg^{-1}	10.00	10.05	10.04
Protein energy ratio	00.63	00.63	00.63

Animals were fed as a group being given 2 kg weekly with daily observations to make sure of the sufficiency of the feed supply. Rejected feed is weighed to determine feed intake by difference and the amount is completed up to 3 kg weekly.

At the end of the experiment, food was withheld from the animals for 12 h prior to slaughter. Slaughter weight was recorded immediately before slaughter. The head was removed at the atlanto-occipital articulation weighed and the four legs and tails were also weighted. Skinning and evisceration were done and the internal organs (stomach, intestine, liver, lungs, heart and kidney) were weighed. Empty Body Weight (EBW), hot carcass weight and hot dressing% were recorded.

The hot carcass was weighed and divided into right and left by sawing along the vertebral column. The left side of the carcass was divided into 4 wholesale cuts (fore leg and shoulder, hind leg and rump, loin and ribs and neck, according to Ashbrook (1955). Each cut was weighed, deboned into muscle and bone and reweighed again.

The significance of differences between means was compared using Computer Package SPSS version 10.

RESULTS AND DISCUSSION

Table 3 shows the average weight of carcass cuts and their percentages of treatment groups fed different hay fodder for 70 days. Treatments showed no significant differences ($p<0.05$) for traits studied. Hot carcass weight in this study was 499.67±160.2, 648.67±44.061 g which is higher than the result reported by Anous (1999) in Burundi local rabbits (458.8±45.9), but lower than the weight for the same trait in New Zealand White rabbit in the same country (842.8±84.3) and for the crosses of New Zealand White with California, Chinchilla, Bauscat rabbits. Dressing percentage of local rabbit in this trial were in the range of 43.53 to 48.53% which are in agreement with Ghosh and Mandal (2008) but lower than the findings of Gasim-Boubaker *et al.* (2007), Elmaghraby (2011), Bawa *et al.* (2008) and Bovera *et al.* (2004). Gasim-Boubaker *et al.* (2007) due this difference to the dependence of carcass yield on breed, age and the number of internal organs left with the carcass of the rabbit at slaughter.

The results indicated in this experiment for cut traits were 50.67±7.02, 46.67±17.24, 100.33±9.29, 70.67±31.88, 59.24±0.46, 49.50±0.01 and 98.29±2.9, 91.86±0.93 g for front leg and shoulder, loin, ribs and hind leg and rump. These results were lower than those reported by Ekpo *et al.* (2009) in mixed strain in Nigeria. The percentages of various cuts are higher than those reported by Adam (2003). Treatment effect was not significant ($p>0.05$) in all parameters. Group C (*Clitoria*) performed the highest values for fore leg and shoulder (50.67±7.02) while group B (sweet potato) showed the highest values for loin (118.33±9.29), ribs (59.24±0.46) and hind leg and rump (98.29±2.90) was highest values in group B (sweet potato).

Group B (Sweet potato) recorded the highest values for all parameters for percentages, group C (*Clitoria*) ranked second in all parameters, and the control group conversely performed the lowest values.

Non carcass traits in this study (Table 4) are lower than the results observed by Al-Dobaib (2010) for V line and Saudi breeds who found 206-220, 223-255, 383-400 g for head, skin and viscera weights, Mehrez and Mousa (2011) in New Zealand White, who reported 57.00-62.86, 19-2 and 112-118 for liver, kidney and head weights, Ghosh and Mandal (2008) who investigated soviet Chinchilla and Grey Giant at 3-3.5 moth of age and reported 252-257, 16.6-17.9 and 84.8-87.8 g for gut full, lung and trachea and feet and tail weights and by Amata and Bratte (2008) in Dutch

Table 3: Weight (g) of carcass cuts and their percentages of the hot carcass of treatment groups fed hay fodder for 70 days (Mean±SD)

Components	F-values#*	A (berseem)	B (sweet potato)	C (*Clitoria*)
Hot carcass	1.15	499.67±160.21	648.67±44.06	557.1±28.58
Fore leg and shoulder	0.08	48.33±11.02	46.67±17.24	50.67±7.02
Loin	0.78	70.67±31.88	10.33±9.029	93.00±23.52
Ribs	3.06	55.89±0.032	59.24±0.046	49.50±0.01
Hind leg and rump	1.06	91.86±0.093	98.29±2.090	92.23±0.97
For leg and shoulder (%)	2.00	17.37±18.45	20.70±17.77	19.67±21.10
Loin (%)	3.20	28.67±10.41	35.00±17.52	30.33±12.01
Ribs (%)	2.82	22.40±0.087	24.78±2.003	24.90±0.35
Hind leg and rump (%)	1.13	32.63±0.063	39.51±2.068	36.21±0.73
Dressing % (Slaughter wt. basis)	0.97	43.53±3.060	48.53±3.003	45.68±5.81

= with (3.20) degrees of freedom, * = Denotes F-value significant at (p>0.05)

Table 4: Slanghter values (g) of treatment groups fed hay fodder for 70 days (Mean±SD)

Parameters	F-values#,*	A (berseem)	B (sweet potato)	C (*Clitoria*)
Slaughter weight	0.95	1133.67±272.50	1340.67±74.01	1210.33±154.21
Heart	1.50	6.00±4.36	4.67±1.15	2.33±0.58
Lung	4.20	7.00±1.00	8.00±1.00	5.00±1.73
Liver	0.44	40.67±14.57	38.00±2.65	45.67±9.60
Kidney	0.42	9.33±1.53	10.67±3.79	9.00±0.00
Stomach	0.51	96.33±25.50	104.67±12.90	88.67±12.10
Intestine	0.27	200.67±6.43	223.00±29.05	207.00±58.92
Head	0.13	107.00±27.50	119.67±5.69	109.33±16.29
Skin	0.26	75.67±29.57	86.33±4.04	87.67±24.67
Feet	0.61	22.67±7.57	23.33±3.21	18.67±5.31
Tail	0.12	8.00±4.36	6.67±3.51	7.33±3.04

= With (3.20) degrees of freedom, * = Denotes F-value significant at (p>0.05)

rabbits in Nigeria, who reported 4.75-5.99, 7.38-11.18, 30.36-42.84, 5.18-6.36. and 0.23-0.45 g for heart, kidney+kidney fat, liver, lung and spleen weights. No significant (p>0.05) differences were observed between treatments

CONCLUSION

This study concluded that the use of sweet potato meal may be recommended as protein and energy source for rabbit. It can be mixed with other feeds and used in compounded ration. Additional work to investigate the economical significant of using sweet potato meal as rabbit feeding compared to the other feeds. Further study's must be done to see if any health effects can be noticed due to sweet potato meal feeding and to detect quality of rabbit meat fed this sweat potato.

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