THE EFFECTS OF BANANA PEELS MEAL INCLUSION ON OFFALS AND CARCASS CHARACTERISTICS OF GROWER RABBITS

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ABSTRACT
The study was conducted to assess the carcass characteristics of grower rabbits fed inclusion levels of banana peels meal (BPL) at 0, 10,20 and 30% levels in diets treatment (T) 1,2,3 and 4 respectively. The study was conducted at teaching and research farm of School of Vocational Education, Federal College of Education, Yola, for eleven weeks. A total of thirty six (36) grower rabbits aged 5-7 weeks with mean initial weight of 837.50± 0.2g were used. Randomized Block Design was used in the research and carcass characteristicswere taken as parameters. The results indicated that significant differences exist in all the parameters measured ($p \leq 0.05$) with T4 having the highest in terms of Head weight 73g, Dressing percentage 57.01%, Carcass weight 764g, Liver 4.0g and Small Intestine 90cm respectively. Based on the results obtained, banana peels canbe included up to 30% as one of the alternative feed to rabbits as substitute for maize so as to reduce the total feed costs which constitute about 60% of production cost.
Keywords: Banana Peels Meals, Carcass characteristic, Grower rabbits, Animal Protein

INTRODUCTION
In developing countries, the vast majority of people have low protein intake. (Alade *et al.,* 2002). Poultry and rabbits keeping provide a method by which rapid transformation in animal protein consumption can be achieved in the humid tropics. However, this can only be achieved if the production process has been modernized (Oluyemi and Robert, 2007).To alleviates this protein deficiency rabbit production should be encourage as it provides a cheapest and reliable source (Mohammed, 2003). There are many good reasons for rabbit production, first it is an alternative livestock species secondly, it is a means of utilizing small rural holdings in a profitable manner and thirdly; it is a more efficient means of converting low quality feed ingredients into meat for human consumption (Alhaidary, *et al;*,. 2010). Besides, Rabbit production can also be a family hobby for semi-rural and urban families and at the same time could give the families a supply of very nutritious meat with all amino acids required for the human body that is low in cholesterol and high in omega 3 fatty acids (McCroskey, 2000).Rabbits have a potential as meat producing animals in the tropics, particularly on subsistence type small farms. Such characteristics as small body size, short generation interval, high reproductive potential, rapid growth rate and the ability to utilize forages and fibrous agricultural by-products are attributes in favour of rabbit production.
Raising rabbits on a small scale in an urban environment can provide a means of converting garden and other food wastes into high quality protein forthe family, while also providing excellent manure forthe garden, which can be fed directly to the rabbit without composting (Joseph *et al.,* 2000; Nuriyasa *et al.,* 2018). Banana plant is not truly a tree, even though they have been known to reach heights of 8 meters or more. The plants are all fibre, and grow by sending out successive groupings of leaves from the stalk, on each trunk, approximately 10 leaves are visible at any one time, while the same number of new leaves wait within the stalk to emerge as the older one falls off.The leaves and peels of banana have little or no use in the tropic rather is regarded as waste.Feeding trials on the use of banana leavesas supplements have been documented (Iyeghe, 2006; Oboh, 2006), However, the use of banana peels in monogastric diet particularly rabbits is very limited (Sumadi, *et al.,* 2019).

MATERIALS AND METHODS

Study Area

The research was conducted at Federal College of Education Yola,Teaching and Research Farm, It lies within the Guinea Savannah Zone of Nigeria within latitude 09.11° north and longitude 12.28°. It has a tropical climate made up of dry and rainy seasons. The rainy season commences in April and ends late October while the dry season starts in October and ends in April. It has an annual rainfall of 800-1500mm. The ambient temperature ranges from 25-44^{0}C (Adebayo and Tukur, 1999).

Experimental Design and Animals Management

Thirty six (36) rabbits aged 5-7 weeks were used for the experiment. The rabbits were of mixed breed. They were purchased around Yola and its environs from individuals that keep rabbits. Two cages were constructed (2.80 x 2.80m x 0.45m) using wood and wire mesh in such a way that it maintains 0.6m above the ground for easy cleaning. Each cage was divided into eighteen compartment/hutches measuring 36 x 36 x 45cm width, length and height respectively. One-week adaptation period was allowed before data collection commenced to enable the animals adjust to new environment and diets. The rabbits were randomly allocated to four dietary treatments in a complete randomized block design. Each treatment was replicated three times with three rabbits per replicate.Feeds were given twice a day- 7:30am and 3:30pm daily.

Data Collection

Initial weight of each animal was obtained before feeding in the morning. Daily records of feed intake and weight gains were also recorded weekly.Twelve (12) animals were slaughtered that is three (3) per treatments each for the determination of carcass and organs characteristics. The experiment lasted for 70 days.

Statistical analysis

Proximate analysis of the banana peels meal and the experimental diets were carried out at National Veterinary Research Institute Vom, (NVRI) Biochemistry laboratory Jos Plateau State, using the procedure, described by AOAC (1990). Data generated were subjected to analysis of variance and Duncan Multiple Range Test was used to separate the treatment means. *($p \leq 0.05$)*.

RESULTS AND DISCUSSION

The composition of the experimental diets was shown in Table 1. The result indicated that treatment one (T1) has no banana peels inclusion (0%), while T2, T3 and T4 have inclusion levels of 10, 20 and 30 % respectively. The metabolizable energy ME (kcal/kg) shows that the diets are similar in energy density with a margin of 50 kcal/kg.

The figures agree with the findings of (Sumadi *et al.,* 2019), where the effects of fish meal replacement with expired milk in ration of male local rabbit (*Lepus nigricollis)* give similar margin. The effects of treatment diets on carcass characteristics of rabbits were shown in Table 2. Average live weight was higher in T3 (1350g) compared to T1,T2 and T4. Highest dressing percentage was observed in T4 (54.90%). Therefore, it was deduced that inclusion of banana peels at 30% encourages higher dressing percentage rather than body weight, therefore rabbit farmers should use banana peels instead of wasting. This findings tally with the work of (Nuriyasa, *et al.,* 2018) where the performance and carcass of local rabbitfed concentrate on different levels based on waste carrot leaf inclusion produced similar results.

Joseph *et al.* (2000) recorded no significant differences between the treatment groups for head, feet and skin when different levels of toasted Bambara Groundnuts Meal on Rabbit Carcass was used in evaluating carcass characteristics of growing rabbits as against the current findings where highest values were recorded in Treatment 4, 73g, 64g and 72g for head feet and felt respectively.

Table 1: Composition of Experimental Diets Fed to Grower Rabbits

Ingredients	T1	T2	T3	T4
Maize offal (%)	81	71	61	52.5
GNC(%)	10	10	10	9
F/meal (%)	8.5	8.5	8.5	8
B/peels (%)	0	10	20	30
Premix (%)	0.25	0.25	0.25	0.25
Salt (%)	0.25	0.25	0.25	0.25
Total (%)	100	100	100	100
Calculated analysis				
ME (kcal/kg)	3073	3025	3033	3069
CP (%)	17.7	17.3	17	15.9
CF (%)	4.5	4.6	5.6	6.2
Calcium (%)	0.5	0.6	0.5	2.1
Phosphorous (%)	0.8	0.3	1	1.9

Table 2: Analysis on Carcass Characteristics of Grower Rabbits Fed Graded Levels of Banana Peels Meal

Parameters	T1	T2	T3	T4	SEM	SD	LS
AVLW	1280^{d}	1300^{c}	1350^{b}	1340^{a}	16.52	33.04	*
Dressing %	54.69^{d}	55.77^{c}	56.30^{b}	57.01^{a}	0.49	0.98	*
Head	70^{c}	70.5^{c}	72^{b}	73^{a}	0.69	1.38	*
Feet	60^{d}	61^{c}	63^{b}	64^{a}	0.91	1.83	*
Pelt	68^{d}	69^{c}	71^{b}	72^{a}	0.91	1.83	*
Main Carcass	700^{c}	725^{b}	760^{a}	764^{a}	15.20	30.39	*
Shoulder	62^{c}	66^{b}	75^{a}	76^{a}	3.42	6.85	*
Rack/Ribs	7.1^{d}	7.3^{c}	7.4^{b}	7.5^{a}	0.09	0.17	*
Loin	12^{b}	14^{a}	14^{a}	14^{a}	0.50	1.00	*
Thigh	20^{c}	22^{b}	22^{b}	23^{a}	0.63	1.26	*
Liver	3.1^{c}	3.3^{c}	3.7^{b}	4.0^{a}	0.20	0.40	*
Kidney	2.2^{c}	2.5^{b}	2.9^{a}	2.5^{b}	0.14	0.29	*
Lungs	2.1^{d}	2.2^{c}	2.3^{b}	2.4^{a}	0.06	0.13	*
Small Intestine	85^{b}	86^{b}	89^{a}	90^{a}	1.19	2.38	*
Large Intestine	75^{c}	76^{b}	78^{a}	78^{a}	0.75	1.50	*
Caecum	50^{b}	53^{a}	54^{a}	55^{aa}	1.08	2.16	*
Stomach	12.0^{d}	13.0^{c}	13.5^{b}	14.0^{a}	0.43	0.85	*

AVLW= Average Live Weight; SEM=Standard Error of Means; Mean in the same row bearing different subscript differ significantly($p \leq 0.05$)L= Level of significant;GIT= Gastro Intestinal Tract;

However, Iyeghe, (2006) recorded no significant differences between treatment groups for Carcass, Loin, Shoulder and Ribs when grower rabbits were fed concentrate and Stylosanthes combinations under tropical conditions. The variation in treatments groups in this research may be attributed to the fact that the banana peels may be richer in nutrients composition as against the stylosanthes used by (Iyeghe, 2006).The result indicated that the Carcass and Small intestine were not significant in T1 and T2 on one hand and T3 and T4 on the other side respectively. The findings agree with work of (Joseph *et al.,* 2000) who reported that there were significant

differences between treatment groups for head, thigh, liver, lungs and kidneys of growing rabbits when palm oil was supplemented at different levels. Therefore, the differences and or similarities obtained in this study might be as a result of the weight of the rabbits selected for the carcass analysis that have varying weights though they were taken randomly, However, the banana peels meal might be another reason for the differences.

CONCLUSION

The study showed that up to 30% of banana peels inclusion in rabbit diet could be included for grower rabbit without any deleterious effects on the carcass characteristics. Other advantages were reduced feed cost and lower cost per kilogram weight gain. The peels can be used to formulate unconventional diet for livestock. The use of such materials that are discarded as waste in compounding feed could help sanitize environment and reduce competition between man and animals for conventional ingredients such as grains and their offal.

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