Assessment of internal organs of weaner rabbits fed graded levels of plantain leaf

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Abstract

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Some available forages during the dry season can serve as a backup for ruminants and pseudo ruminants such as rabbits. One of such forages is the plantain leaf (PL). Due to scarce information of its effect on rabbits, this study was therefore, conducted to determine the organs response upon feeding it. Thirty mixed bred rabbits were randomly allotted to five experimental treatments. Five treatments were: concentrate compounded diet (T1/control), while T2, T3, T4 and T5 comprised T1(30g PL) and 25g, 50g, 75g and 100g plantain leaf (PL), respectively. The study lasted for 56 days. The parameters measured were liveweight, liver, kidney (left and right), bile, lungs, heart, testes and ovary. The performance data showed that mean body weight gain and feed conversion ratio were significantly ($p < 0.05$) better in rabbits fed the concentrate (12.14 g/d and 4.65 respectively) than other treatments, though those on T5 was comparable. For the live weight, there were no significant differences amongst the treatment. There were no significant ($p > 0.05$) differences in the organ weights of the rabbits for all the parameters measured except bile, and heart which were significant ($p < 0.05$). Rabbits on T1 recorded the highest weight (3.93% dressed weight) in heart though similar ($P > 0.05$) with those on T3 (2.60%). However, rabbits on T5 recorded a higher numerical weight ($p > 0.05$) for liver, kidney (left and right) and ear (left and right). From the results, it can be concluded that feeding up to 100g/day of plantain leaf did not pose any adverse effects on the organ weights of weaner rabbits.

Keywords: Rabbits, organs, concentrate, plantain leaf, weight

Introduction

Makinde (2016) reported that rabbits have been recognized to possess a very important role to play in the supply of animal protein to Nigerians especially in rural and per-urban areas. They are efficient converters of feed to meat and capable of utilizing up to 30% crude fibre as against 10% by most poultry species (Egbo *et al.*, 2001). Igwebuike *et al.* (2001) also noted that rabbits can utilize unconventional feedstuffs such as blood meal and diverse forage materials such as velvet bean leaf meal (Sese *et al.*, 2014), wild sunflower leaf (Olabanji *et al.*, 2007), and other diverse plant materials. This is why attention is now being shifted to rabbit production in order to solve the issue of animal protein shortages (Olabanji, *et al.*, 2007). To make rabbit production more viable as a small scale business, Makinde *et al.* (2014) had

advocated the development of alternative feeding materials that will be relatively cheap when compared with commercial feeds or conventional feedstuff. This necessitates the idea of plantain which is readily available during the dry season. Studies have been conducted to determine the feeding value of plantain leaf as an emergency feed in case of drought or feed shortage (Reynolds, 1995), and its ability to provide water for animals when it is consumed as feed thereby reducing the quantity of water intake. This is as a result of high moisture content of the leaves and stem (Fielding, 1991). They are noted to contain about 15% dry matter and 10-17% crude protein and very high in crude fibre (Marie – Magdalene *et al.*, 2010). Protein content in leave blade is substantial and hence ideal for cattle feed and they have been noted to increase the nutritive value in

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livestock rations (Clarke, 1979). Plantain foliage could be included up to 15% in the rations of lactating cows without significantly altering milk production, though dairy performance and digestibilities decreased as plantain foliage increased (El-Ghani, 1999). However, very little has been reported on the effect of feeding plantain leaf to rabbits. Knowledge of the effect on the organ of rabbits will help ration formulation and in improving production. It has therefore become necessary to investigate the reaction of the organs (weight basis) of the rabbits to dietary intake of plantain leaves.

Materials and methods

Location

This study was conducted at the rabbitry unit of the University of Uyo Teaching and Research Farm. The mean annual rainfall is 800mm and with a temperature range of 28-

32°C. The study was carried out between April and May 2016.

Sourcing of experimental materials

The rabbits were procured from a rabbit farmer in Uyo, Akwa Ibom State. The plantain leaves were harvested green from household and school farms.

Experimental diet

A concentrate diet was formulated as seen in Table 1 while the plantain leaf was incorporated at graded levels. The five experimental diets consisted of the following:

Treatment 1: 60g concentrate

Treatment 2: 30g concentrate plus 25g plantain leaf

Treatment 3: 30g concentrate plus 50g plantain leaf

Treatment 4: 30g concentrate plus 75g plantain leaf

Treatment 5: 30g concentrate plus 100g plantain leaf

Table 1: Composition of concentrate diets

Ingredient	%
Maize	58.00
Soyabean meal	10.00
Wheat offal	10.00
Fish meal	7.00
Bone meal	10.00
Palm kernel cake	1.50
Salt	0.50
Premix	2.50
Lysine	0.25
Methomine	0.25
Total	100.00

Animals and their management

Thirty mixed bred rabbits of both sexes with ages ranging from 6-8 weeks old were randomly divided into five treatment groups (T1, T2, T3, T4 and T5). Each treatment was replicated three times of two rabbits each. The experiment lasted for eight weeks after 10 days of pre-feeding trial to adjust to the feeds and hutch prior to the 8 weeks data collection. The initial weight of the rabbits ranged from 0.65 kg –

0.75 kg. The rabbits were housed individually in all-wire cages which was designed for easy collection of faeces and urine and ensure sanitation. They were provided with water while feed was served twice daily at 8am and 5pm.

Carcass evaluation

At the end of growth performance (8 weeks) three rabbits were slaughtered. Prior to slaughtering, they were fasted for 12 hours and weighed to determine the final

live weight. Evisceration was carried out immediately by removing the viscera and intestines. Internal organs harvested were weighed hot such as liver, kidney (left and right), bile, lungs, heart, tests and ovary. The weights were expressed as the percentage of the dressed weight.

Proximate analysis

Proximate components of the concentrates and plantain leaf were determined as prescribed by AOAC (1995).

Statistical analysis

All data collected on the internal organs were subjected to analysis of variance (ANOVA) according to Snedecor and Cochran (1978) and where significant differences between the means were indicated, New Duncan's Multiple Range Test (NDMRT) as outlined by Obi (1990)

was used to separate the means.

Results and discussion

The proximate composition of the experiential feedstuffs (concentrate and plantain leaf) is presented in Table 2. The concentrate diet and plantain leaf contained 19.30% and 10.98% crude protein respectively. The crude fibre content of the plantain leaf (8.11%) is comparable with the value of concentrate (9.97%). The value of crude protein obtained for plantain leaf used in this study was lower than that cited by Aduku and Olukosi (1990). This difference may be attributed to stage of growth as at harvest, species or processing. The crude fibre value obtained in this study was also lower than that reported by Aduku and Olukosi (1990).

Table 2: Proximate composition of concentrate diet and plantain leaf

Parameters	Concentrate (%)	Plantain leaf (%)
Dry matter	92.74	36.85
Moisture	7.26	63.15
Protein	19.30	10.98
Fat	11.11	1.84
Crude fibre	9.97	8.11
Ash	18.18	13.55
Nitrogen free extract	41.44	65.52

Table 3 show growth performance and internal organs percentage of the rabbit fed plantain leaf. The mean body weight gain and feed conversion ratio were significantly ($P<0.05$) better in rabbits fed the concentrate (12.14 g/d and 4.65 respectively) than other treatments, though those on T5 was comparable on weight gain alone (11.96 g/d). The mean daily weight gain in this study is higher than 2.27 g/day reported for growing rabbits fed solely with mulberry leaves by Bamikole *et al.* (2005) while being comparable with those reported by Oloruntola *et al.* (2015) of 7.14 – 12.03 of rabbits fed elephant grass, tridax, tridax and pueraria and elephant grass and pueraria together with concentrate. The

organ weights were not significantly ($P>0.05$) different among the treatments, except for bile and heart which were significant ($P<0.05$). It is common practice in feeding trials to use weights of some internal organs like the liver or kidneys as indicators of toxicity because they should differ significantly if there was any serious effect of anti-nutritional factors on them being major detoxification organs (Sese and Berepubo 1990). The difference in weight would arise because of increased metabolic rate of the organs in attempt to reduce toxic elements to non-toxic metabolites (Bone, 1979). It is obvious from this study that the weight of bile was highest ($P<0.05$) in plantain leaf fed rabbits (T3) and least in

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control as a result of increased metabolic rate. However, for heart weight, rabbits on control had the highest. The non-significance of other organ weights as

reported in this study agrees with that of Ogunsipe *et al.* (2014) for rabbits fed sorghum offal-based diets.

Table 3: Performance and organs of rabbit fed plantain leaf

Parameters	T1(Control)	T2(25g)	T3(50g)	T4(75g)	T5(100g)	SEM
Live weight (kg)	1.09	0.95	0.99	0.96	1.13	0.11
Mean body weight (g/d)	12.14 ^a	4.11 ^c	7.14 ^{ab}	6.25 ^a	11.96 ^a	0.02
Feed conversion ratio	4.65 ^c	12.26 ^b	10.16 ^c	14.85 ^a	9.46 ^d	2.10
Liver (% dressed weight)	26.47	23.13	25.30	24.00	29.90	4.58
Kidney (right)	3.30	3.20	3.27	2.96	3.97	4.23
Kidney (left)	3.30	2.93	3.53	2.70	3.93	6.46
Bile	0.33 ^c	0.67 ^{ab}	1.30 ^a	0.53 ^b	0.70 ^{ab}	0.21
Lungs	6.17	5.90	7.10	6.07	6.30	0.83
Heart	3.93 ^a	2.33 ^b	2.60 ^{ab}	2.13 ^b	2.40 ^b	0.45
Testes	2.53	na	1.30	0.47	1.07	0.95
Ovary	0.23	0.97	0.63	0.23	1.83	0.74

abc means on the same row with different superscripts are significantly different (p<0.05)

na – not available; T represents treatment of plantain leaf

Conclusion

The study showed that plantain leaf could be efficiently or effectively utilized and tolerated by weaner rabbits up to 100g/day without much deleterious effect on performance and internal organs.

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