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EVALUATION OF FALSE YAM (*Icacina oliviformis*) LEAVES ON THE GROWTH PERFORMANCE OF WEANER RABBITS (*Oryctolagus cuniculus*)

T. ANSAH[1], A.A. EMELIA[1], G. DEKU[2], P.K. KARIKARI[2]

[1]*Department of Animal Science, Faculty of Agriculture, University for Development Studies, Tamale, Ghana*
[2]*Faculty of Agriculture, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana*

*Email: ansahterry@yahoo.com

ABSTRACT: *This study was conducted to determine the effect of Icacina oliviformis leaf meal (IOLM) on the growth performance of weaner rabbits. Twenty-one (21) weaner rabbits with an average initial weight of 661g were used in a completely randomized design. The feeding trial lasted for 56 days at the livestock unit of the University for Development studies. The chemical analysis was carried out at the Spanish Laboratory of the University for Development studies. The variables measured were feed intake, apparent nutrient digestibility and body weight gain. The average daily feed intake showed a significantly (P<0.05) higher intake for T2 (129.27g) compared with T0 (125.11g). Average daily body weight gain was significantly (P<0.05) higher for T0 (17.65g) compared to T2 (10.83g). However there was no significant difference (P>0.05) between T0 (17.65g) and T1 (13.33g).There was a significantly (P<0.05) higher crude protein digestibility for T0 (84.68%) compared to T1 (80.99%) and T2 (67.08%). Apparent digestibility for CP and EE decreased with increase in the level of IOL in the diet. Based on the results of this study, IOL can be used as a feed ingredient in the diet of rabbits at 5% without any detrimental effects.*

ORIGINAL ARTICLE

Key words: *Icacina oliviformis, Rabbits, performance, apparent digestibility*

INTRODUCTION

Rabbit production in developing countries is based on low cost feeding, using locally available feedstuffs (Mailafia et al., 2010). In developed countries where commercial rabbitary is on the lead, feeds are compounded to increase growth rate and to minimize labor requirements (Walsingham, 1972). However, in developing countries more important considerations would be to formulate cheap diets based on feedstuffs that are of little direct value as human food. If the rabbits are kept on a small scale, diets such as green succulent fodders can be fed with little costs. Current feeding practices vary widely in the tropics, depending on the types of feed materials that are available locally (Aduku and Olukosi, 1990)

Rabbits may be maintained solely on green feeds together with household vegetable waste. However, careful management and balancing of diets is necessary (Aduku and Olukosi, 1990). The two most common deficiencies encountered in such diets are of energy and protein rather than minerals or vitamins. Although the rabbit is by nature herbivorous, growth rates on forage based diets containing high fiber levels will be increasingly curtailed with increasing fiber level. This is due to the animal's inability to obtain sufficient digestible material to satisfy its energy demands. The nature of the fibrous components is also important; the greater the degree of lignifications, the greater the reduction in the digestibility.

Icacina oliviformis is an under exploited savannah shrub used for its edible seeds, tuberous roots, and fruit mesocarp in many areas of Africa. The large seeds provide a relied-upon resource in Senegal, Guinea-Bissau, and the Central African Republic at the end of the dry season when food reserves in the villages are at their lowest levels. The tuber sometime weighs over 50kg; provide a rich source of starch in times of famine (Fay, 1987). Fay, (1991), reported the following proximate composition for false yam seed and tuber; Seeds contains 80.7% nitrogen-free extract (NFE), 14.0% crude protein, and 0.5%crude fat (dry weight).The average moisture content of live seeds is 18.3%. The roots contain 84.5% NFE, 4.4% crude protein and 1.6% crude fat (dry weight). The leaves of *Icacina oliviformis* has not been exploited since the plant was discovered, hence no adequate information on the utilization of the leaf as feed for rabbits is documented.

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It is against this background that the study was conducted to investigate the effect of *Icacina oliviformis* leaf on the growth of weaner rabbits.

This experiment was aimed at determining effects of *Icacina oliviformis* leaf meal on intake and growth of weaner rabbits.

MATERIALS AND METHODS

Study area

The experiment was conducted at the livestock section of the Department of Animals Science, University for Development Studies, Nyankpala campus, Tamale. This location lies on latitude 9˚25'45'N and Longitude 0˚58'42'N at altitude 183m above sea level (SARI, 2001) which is generally described as a hot dry savannah zone. Rainfall is monomodal which occurs in April to October with the dry season setting in from November to March .The temperature of the area ranges between 19˚c (minimum) and 42˚c (maximum). The experiment lasted for 56 days from 5th October to 11th December 2010.

Source and processing of *Icacina oliviformis* Leaves

False yam (*Icacina oliviformis)* leaves were harvested manually from the wild in Nyankpala, succulent leaves were harvested and sun dried for eight hours. The dried leaves were milled with hammer grounding mill to a coarse texture. A top pan scale was used to weigh the milled leaves. The processed false yam leaves were bagged and stored for use.

Experimental Diet

Three experimental diets were formulated with inclusion levels of *Icacina oliviformis* leaves at 0%, 5% and 10%.The experimental diets were labeled T0(0%), T1(5%) and T2 (10%) respectively. T0 represents control diet and thus contained no IOL, while T1 contained 5% and T2 contained 10%. See Table 1 for the inclusion levels and chemical compositions of the different treatment diets.

Table 1 - Composition of experimental diets (%)

Ingredients	Levels of *Icacina oliviformis* leaf (IOL) in diets (%)		
	T0 (0%)	T1 (5%)	T2 (10%)
IOL	-	5	10
Soyabean meal	16	16	16
Sheanut cake	15	15	10
Brewers spent grain	68	63	63
Vitamin/mineral Premix*	0.25	0.25	0.25
Dicalcium	0.25	0.25	0.25
Salt	0.5	0.5	0.5
Analysed nutrient Composition (%)			
Dry matter	93.7±1.9	93.4±0.8	93.2±2.7
Crude protein	18.6±13.5	17.2±4.5	18.2±19
Ether Extract	6.9±0.5	7.7±9.6	7.0±0.1
Ash	9.9±1.4	9.9±0.7	9.9±1.4
Organic matter	83.8±1.9	83.4±0.8	83.2±2.7

* Premix composition (per kg of diet): vitamin A, 12,500 IU; vitamin D3, 2500 IU; vitamin E, 50.00mg; vitamin K3, 2.50mg; vitamin B1, 3.00mg; vitamin B2, 6.00mg; vitamin B6, 6.00mg; niacin, 40mg; calcium pantothenate, 10mg; biotin, 0.08mg; vitamin B12, 0.25mg; folic acid, 1.00mg; chlorine chloride,300mg; manganese, 100mg; iron, 50mg; zinc, 45mg; copper, 2.00mg; iodine, 1.55mg; cobalt, 0.25mg; selenium, 0.10mg; antioxidant, 200mg

Chemical Analysis of Experimental Diet

Samples of the FYLM and fecal matter were analyzed for their composition of crude protein (CP), Ether extract (EE), DM, and Ash. The analysis was done in the Spanish laboratory of the University for Development Studies. 200g of each treatment diet and fecal matter were weighed and dried in an oven for 48 hours at 60˚c. The weight after drying was used for computing the dry matter percentage.

Crude protein, ether extract and ash were determined according to the procedure of AOAC (2002). 10g of each treatment diet was collected ground and sieved to pass through 3mm sieve for the analysis of CP, E.E and Ash.

Experimental animals

Twenty one weaner rabbits were sourced from Kwame Nkrumah University of Science and Technology .They were brought into the farm which was already prepared for their arrival. On arrival they were given glucose in water to reduce stress, they were also fed with concentrates. Water was given *ad libitum*. Experimental animal were adjusted for one week on the experimental diet. Medication was given to animals when the need arose.

Experimental Design

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A 56 day feeding trial was conducted using a complete randomized design (CRD). The design consisted of three dietary treatments each replicated seven times. Each treatment had 3males and 4 females. The mean initial weights of the weaner rabbits was 661g. Animals were randomly assigned to the cages individually.

Management of rabbits

The rabbits were housed in wire mesh cages .Each raised 1m above the ground. The height of the hutch was 60cm at the front, 50cm at the back and width was 50cm-60cm.The Length was 90-120cm.water was provided *ad libitum*. Each cage was provided with an earthen were bowl for water and feed.

Data collection

The parameters of interest included feed intake, weight gain and apparent digestibility. The animals were given 200g of feed daily between 6:30am and 4:30pm. The left over feed was collected and weighed using a top pan scale. The growth pattern of the rabbits was determined by weighing each rabbit every week, early in morning before feeding, over a period of 56 days. Fecal droppings from each animal were collected for two weeks after one week of adjustment. 100g of each animal fecal matter was sub-sampled and used for the determination of apparent DM, CP,EE and Ash digestibility.

Data analysis

Data collected was analyzed using ANOVA from Genstat discovery editions. Means were separated using LSD. Results were presented in tables.

RESULTS AND DISCUSSION

Results from the experiment can be found in table 2 below. From table 2, final weight was significantly higher for T0 (989.0g) compared with T2 but was not significantly different from T1. It was observed from table 2 that daily weight gain and final weight decreased with increase in the level of IOL (T0>T1>T2). Daily weight gain was also significantly higher for T0 (17.65g) than T2 (10.83g). However there was no significant (P>0.005) difference between T0 and T1. According to Champe and Maurice (1983), rabbits require more than 9% crude fiber in feed for normal growth. Rabbits require some level of forage in their diet to enhance digestibility hence the use of *Icacina Oliviformis.* However the results rather showed a significantly lower weight gain as *Icacina Oliviformis* level increased in the diet. The results obtained could be attributed to the presence of some anti-nutritional factors (ATF) present in most browse plant such as *Icacina Oliviformis* (Robbins 1993 and Robins et al., 1995). These ATF's include phenolics and terpens which have been reported by Robbins (1993) and Robins et al. (1995) to be responsible for reduction in dry matter digestibility. Terpens according Villalba et al. (2006) decreased the concentration of Volatile fatty acids (VFA) in the caecum. These properties could have accounted for the significantly low weight gain recorded as the level of *Icacina Oliviformis* increased in the experimental diet. Dei and Adeti, (2010) reported a favorable results when boiled false yam tuber was fed to broiler. At 30g/kg inclusion, there was no significant different between the boiled tuber and raw tuber in the final weight. This suggests that further treatment of the leaves could have reduced the effect of the ATF's present in the IOL. The relatively low weight gain in T1 and T2 compared to the control could have been due to the poor utilization of the nutrients. Since the digestibility was low for T1 and T2, lower amounts of nutrients will be available thereby affecting its utilization for growth in the animals.

Table 2 - Performance and apparent nutrient digestibility of rabbits fed increasing levels of *Icacina oliviformis* leaf (IOL)

Parameters	Level of IOL in diet (%)			
	T0 (0%)	T1 (5%)	T2 (10%)	SED
Initial weight	703.0	644.0	639.0	61.1
Weight gain, g/day	17.65^{a}	13.33^{ab}	10.83^{b}	2.32
Feed intake, g/day	125.11^{b}	128.65^{a}	129.27^{a}	0.72
Final weight gain	989.0^{a}	746.0^{ab}	606.0^{b}	129.7
Gain/Feed	0.14^{a}	0.10^{ab}	0.08^{b}	0.02
Digestibility (%)				
Crude protein	84.68^{a}	80.99^{b}	67.08^{b}	0.42
Ether extract	48.6^{a}	40.9^{b}	32.3^{c}	3.18
Ash	50.21	50.00	50.14	0.17
Organic matter	64.05^{a}	62.23^{a}	45.09^{b}	1.11

$^{a,b,c:}$ Mean values in row with uncommon letters are significantly different at P<0.05

From Table 2 above, intake was significantly lower for T0 (125.11g/day) compared to T1 (128.65g/day) and T2 (129.27g/day). There was an increase in intake with increase in IOL. The trend observed could be attributed to high crude fiber present in the IOLM diet. High crude fiber levels have been reported by Wen-Shyg Chiou et al. (1998) to increase rate of passage in the digestive tract there by leading to a higher intake. Even though intake was high for T1 and T2, it did not correspond to an increase in weight gain. This could be due to the less time the feed stayed in the ileum as a result of the faster rate of passage. Nutrient absorption was reduced as a result.

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Apparent crude protein digestibility was significantly higher for T0 (84.68%) compared to T1 (80.99%) and T2 (67.08%). The trend was the same for organic matter and ether extract. Apparent nutrient digestibility decreased with increase in the level of IOL in the diet. This result disagrees with Ajayi et al. (2007) who reported an increase in apparent CP digestibility with increase in sun flower leaf meal mixture. The difference obtained in the current study could be due the IOL. This is an indication that different shrubs are digested differently by rabbits. The presence of terpens in IOL may have accounted for the low digestibility of the crude protein. The higher passage rate that may have been caused by the high fibre in the IOL could have also contributed to the low digestibility. The low apparent nutrient digestibility could have contributed to the lower body weight recorded in T1 and T2.

CONCLUSION AND RECOMMENDATION

Based on the results of this study, it can be concluded that, feeding IOL at 5% improved feed intake, digestibility and weight gain.

It is recommended that 5% IOL be included in the diet of rabbits.

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REFERENCES

Aduku AO and Olukosi JC (1990). Rabbit Management in the Tropics: Production, processing Utilization, Marketing, Economics, practical training, Research and Future prospects, Living book service, G.U publication, Abuja.

Ajayi AF, Farinu AO, Ojebiyi OO and Olayeni TB (2007). Performance evaluation of male weaner rabbits fed diets containing graded levels of blood – wild sunflower leaf meal mixture. World journal of Agricultural Science 3 (2): 250 – 255, 2007. ISSN 1817 – 3047.

AOAC (2002). Official Methods of Analysis of Official Chemists. 17th Ed, Association of Analytical Chemists, Washington DC, USA.

Champe KA and Maurice DV (1983). Effect of different level of fiber on performance of growing rabbits. Journal of Applied Rabbit Research, 6(2): 64 – 67.

Micheal Fay J (1987). Iacina Oliviformis (Icacinaceae): A close Look at an under exploited crop. I Overview and Ethnobotany. Economic Botany, 41(4), 1987, pp.512-522.

Micheal Fay J (1991). Iacina Oliviformis (Icacinaceae): A close Look at an under exploited crop. II Analysis of Food Products. Economic Botany, 41(4), 1987, pp.512-522.

Robbins CT (1993). Wildlife Feeding and Nutrition. Academic Press, Inc. San Diego, Cal.

Robbins CT, DE Spalinger and Van Hoven W (1995). Adaptation of ruminants to browse and grass diets: Are anatomical-based browser-grazer interpretations valid? Oecologia 103:208-213.

SARI (2001). Savanna Agriculture Research institute, Agro – metrological station, Nyankpala station .Pp 10

Villalba JJ, Provenza FD, Olson KC (2006) Terpenes and carbohydrate source influence rumen fermentation, digestibility, intake, and preference in sheep. J Anim Sci. 2006 Sep; 84(9):2463-73.

Walsingham JM (1972). Meat production from rabbits. Ecological efficiency studies 1. Technical report No.12, grassland Research Institute, Hurley, Maiden head, Berks.

Wen–shyg chiou P, Yu B and Lin C (1998). The effect of different fiber compo stents on growth rate, nutrient digestibility, rate of digesta passage and hind gut fermentation in domesticated rabbits laboratory animals 32: 276 – 283.

Dei HK and Adeti J (2010). Effect of sun-dried and boiled false yam (Icacina oliviformis) tuber meal on the performance of broiler chicken. Program and book of abstract. XIIIth European poultry conference. Poster session 1 Pp343.