Sjournals
Scientific Journals

Scientific Journal of Animal Science (2015) 4(12) 187-191
ISSN 2322-1704
doi: 10.14196/sjas.v4i12.2047

Contents lists available at Sjournals
Scientific Journal of Animal Science
Journal homepage: www.Sjournals.com

Original article

Performance of weaner rabbits fed diets supplemented with Pawpaw (Carica Papaya) leaf meal

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ARTICLE INFO

Article history,
Received 21 November 2015
Accepted 22 December 2015
Available online 28 December 2015
iThenticate screening 25 November 2015
English editing 20 December 2015
Quality control 24 December 2015

Keywords,
Rabbits
Pawpaw leaf meal
Productive performance
Supplementation

ABSTRACT

14 weeks feeding trial was conducted to evaluate the effect of feeding pawpaw leaf meal (PLM) on the growth performance and carcass characteristics of weaned rabbits. Fourty five (45) weaned rabbits were used in a completely randomized design with five dietary treatments, each replicated three time with three (3) rabbits per replicate. The five inclusion levels of PLM (0%, 5%, 10%, 15% 20% PLM) were used. Experimental animals were housed in metal hutches having separate feeders and drinkers. They were randomly assigned to the five experimental diets of PLM. Feed intake and weight gain were measured weekly. Carcass evaluation was conducted at the end of the study. The results showed that there was no significant difference (P>0.05) among all the treatments with respect to feed intake and feed-gain ratio. Weaner rabbits fed the control diet (0% PLM) and those fed 10% PLM recorded higher weight gains (960.33g and 967.00g respectively) than those fed 5% PLM and 15% PLM (934.33g and 932.50g respectively). Dressed weight was affected (P<0.05) by the different dietary treatments. It decreases with increase in PLM inclusion. With 0%PLM having the highest dressed weight and 15%PLM having the least. The percentage shoulder, loin, thigh and rack were not affected (P>0.05) by feeding up to 15%PLM. It is therefore concluded that feeding pawpaw leaf meal did not

adversely affects the performance of rabbits.

1. Introduction

If high demand for meat in developing countries have to be met, attention should be drawn to the production of rabbits which have short cycle and inexpensive to rear (Aduku et al., 1990). Rabbits have high potential for converting feed to meat; the actualization of it depends on the quality of nutrition. Presently the prices of most conventional feed ingredients are high sequel to stiff competition for them directly by man and industrial usage (Ojebiyi et al., 2008). In view of this, the need to develop alternative feed resources that are cheap, readily available and with great potentials in supporting livestock growth becomes imperative (Omoikhoje et al., 2006). Consequently, researchers are diverting attention to the rabbit's natural habit of high forage intake (Omoikhoje et al., 2006). Forages, especially legumes, with their high protein content, have the potential of meeting the need for cheaper feed sources for rabbits (Iyeghe-Erakpotobor et al., 2006).

The pawpaw plant (Carica Papaya Linn) which stands about 4-5m tall on the average but could reach 10m in height always survives the "bush fire" as it is growing mostly around homes. Parts of the pawpaw plant have been reported to be rich in nutrients and are suitable for the feeding of rabbits especially, in the dry season (Bitto et al., 2006).

Studies had been conducted on the effect of feeding different pawpaw parts on the performance of rabbits. Bitto et al. (2006) reported that feeding up to 30% pawpaw peel meal supported normal body functions and the physiology of reproduction in female rabbits. Pawpaw does not have any deleterious effects on the haematological components of rabbits fed their leaf meals (Nodu et al., 2014). This study was conducted to determine the effect of the pawpaw leaf meal on growth performance and carcass characteristics of weaner rabbits. Successes in this work would reduced the dry season feeding problems of rabbit farmers and add more value to pawpaw leaf which is lowly competed by man and agro allied industries.

2. Materials and methods

2.1. Preparation and processing of experimental diets

Fresh pawpaw leaves were harvested from pawpaw plants around Abia state university, Umuahia campus. The leaf stalks were removed and the leaves sun-dried under shade. The dried leaves were milled and the leaf meal was used to formulate the experimental diets. Maize and soybeans were the major ingredients. Five experimental diets were formulated with varying levels of inclusion of PLM with diet one serving as control having no PLM (0% PLM). Diets two, three, four and five have inclusion levels of 5%PLM, 10%PLM, 15%PLM and 20%PLM respectively. The composition of the diets is represented in table 1.

2.2. Experimental animals and their management

The experiment was conducted at the rabbitry unit of Abia State University Research and Teaching Farm. Forty five (45) 7 week's old weaner rabbits of both sexes were obtained from commercial rabbit farm in Akwa Ibom State. The animals were randomly allocated to five experimental diets (treatments) in a completely randomized design with nine (9) rabbits per treatment diet. Each treatment was replicated three times with each replicate having three rabbits. The rabbits were housed in a metal hutches equipped with separate feeders and drinkers. Seven-(7) days preliminary period was allowed for acclimatization. All routine management practices were strictly adhered to. Feed and water were provided *ad libitum*. The experiment lasted for 14 weeks.

2.3. Data collection

Productive performance parameters such as body weight, feed intake and feed/ gain Ratio were measured as follows:

$$\text{Mean daily weight grain} = \frac{\text{Mean final weight - Mean initial weight}}{\text{Total Number of days}}$$

$$\text{Mean daily feed intake} = \frac{\text{Mean total feed intake}}{\text{Number of days of experiment}}$$

$$\text{Feed-to -gain ratio (FGR)} = \frac{\text{Mean total feed intake}}{\text{Mean total weight gain}}$$

Carcass evaluation:

At the end of the growing period, carcass evaluation was carried out using the three rabbits per treatment. The rabbits were weighed, slaughtered, well bled and skinned. After removal of the head, the carcasses were eviscerated manually and then weighed to obtain carcass weight. The shoulder, loin, thigh and rack were cut and their weights determined and expressed as percentage of live weight.

2.4. Statistical analysis

Data from the experiment were analyzed using the general linear models (GLM) procedure of SAS software (SAS, 2002). Data were subjected to analysis of variance with initial weight set as a covariate. Where the analysis of variance was significant, Duncan's multiple range test was used to separate treatment means.

Table 1
Composition of the experimental diets.

	Diets				
Ingredients	**1**	**2**	**3**	**4**	**5**
Yellow Maize	40.00	40.00	40.00	40.00	40.00
wheat Offal	16.00	16.00	16.00	16.00	16.00
Pawpaw leaf Meal	00.00	05.00	10.00	15.00	20.00
Palm Kernel Cake	10.00	10.00	10.00	10.00	10.00
Soybeans meal	10.00	10.00	10.00	10.00	10.00
Brewers dried Grain	20.00	15.00	10.00	05.00	00.00
Bone Meal	03.00	03.00	03.00	03.00	03.00
Premix	0.25	0.25	0.25	0.25	0.25
lysin	0.25	0.25	0.25	0.25	0.25
Methinoine	0.25	0.25	0.25	0.25	0.25
Salt	0.25	0.25	0.25	0.25	0.25
TOTAL	100.00	100.00	100.00	100.00	100.00
Determined analysis (%)					
Dry Matter	96.3	96.9	96.83	96.01	96.20
Crude Protein	18.11	19.11	21.11	22.11	22.10
Crude Fibre	9.25	10.06	11.38	12.45	12.53
Ether Extract	7.16	7.06	6.96	6.86	6.88
Metabolizable Energy Kcal/g	2.4	2.39	2.33	2.30	2.31

3. Results and discussion

3.1. Growth performance

The effects of experimental diet on productive performance of weaned rabbit are as shown in table 2. The result showed that there was no significant difference ($P>0.05$) among all the treatments with respect to feed intake and feed-gain ratio. Similar to the findings of this study Unigwe et al., (2014) observed similar feed conversion ratio (FCR) when they fed different levels of PLM to broilers. However, feed intake was affected by feeding PLM to broilers (Unigwe et al., 2014). Aderinola et al. (2008) observed higher feed intake and feed efficiency with increase in *Centrosema pubescens* inclusion in the diets of growing rabbits. This shows that the

rabbits were able to handle the PLM as rabbits have the potential to utilize high level of forage in their diet (Leng, 2008). Rabbits possess a functional caecum which has the ability to extract nutrients from fibrous feedstuffs (de Toledo, 2008).

Total weight gain and average daily weight gain were significantly affected (P<0.05) by varying PLM levels in the diets of weaner rabbits. Weaner rabbits fed the control diet (0% PLM) and those fed 10% PLM recorded higher weight gains (960.33g and 967.00g respectively) than those fed 5% PLM ,15% PLM and 20% PLM (934.33g, 932.50g and 912.11g respectively). Weaner rabbits the 5% PLM and 15% PLM had similar weight gain than those fed the highest level of inclusion (20%). In the same vein, the weight gain of weaned rabbits on *Calapogonium mucunoides* increased with increase in inclusion levels (Aderinola et al., 2008). On the contrary, Unigwe *et al.,* (2014) observed similar body weight gain when they fed different levels of PLM to broilers. The decrease in weight with increase in PLM inclusion is probably due to the lower crude fibre of the control (0%PLM) compared to the 15%PLM diet which has higher fibre as supplied by the PLM since fibrous diets are not well utilized by monogastrics (Onyimonyi and Onu, 2009). In another study, it was observed that daily weight gain of rabbits increased as the inclusion level of *Centrosema pubescens* increased (Aderinola et al., 2008).

In all the various percentages of inclusion of PLM in the diet of the weaned rabbits, there was no mortality recorded. This indicates the suitability of PLM as feed ingredient in feeding weaned rabbits.

Table 2
Growth performance of weaned rabbits fed PLM.

	Level of inclusion of PLM (%)					
Parameter	**0**	**5**	**10**	**15**	**20**	**SEM**
Initial weight(g)	680	674	688	682.3	697.66	3.01
Final weight (g)	1640.00^{c}	1608.00^{d}	1655.00^{b}	1674.00^{a}	1609.77^{d}	4.88
Mean gain (g)	960.33^{a}	934.33^{b}	967.00^{a}	932.50^{b}	912.11^{c}	3.86
Mean daily weight gain (g)	9.80^{a}	9.53^{b}	9.87^{a}	9.51^{b}	9.31^{c}	0.05
Mean feed intake (g/day)	76.00	76.73	76.80	78.13	77.56	1.67
Feed- to- gain Ratio	7.75	8.04	7.78	8.23	8.33	0.31

$^{a, b, c}$ means in a row with no common superscript(s) differ significantly (P<0.05), SEM – standard error of mean, PLM – Pawpaw leaf meal.

3.2. Carcass characteristics

The carcass characteristics of weaned rabbits fed PLM are shown in table 3. Dressed weight was affected (P<0.05) by the different dietary treatments. It decreases with increase in PLM inclusion. With 0%PLM having the highest dressed weight and 15% PLM and 20% PLM having the least. Contrary to the results of this study, Nuhu (2010) observed similar dressing percentage when he fed Moringa leaf meal to growing rabbits. The dressed weights (960g – 1092g) observed in this study conforms to the dressed weights (988.24g – 1335.00g) reported by Biya et al. (2008) in the tropics.

The percentage shoulder, loin, thigh and rack were not affected (P>0.05) by feeding up to 20%PLM.

Table 3
Carcass characteristics of weaned rabbits fed PLM.

Parameter	Level of inclusion of PLM					
	0	5	10	15	20	±SEM
Live weight (g)	1640.00^{c}	1608.00^{d}	1655.00^{b}	1674.00^{a}	1609.77^{d}	4.88
Dressed weight (g)	1092.00^{a}	1053.00^{b}	984.00^{c}	960.00^{d}	960.00^{d}	5.72
Dressing percentage (%)	66.59	65.49	59.46	57.35	59.63	4.14
Shoulder (%)	15.12	14.61	13.72	12.72	12.44	1.50
Loin (%)	11.46	11.13	10.39	9.68	9.45	1.38
Thigh (%)	28.90	27.99	26.22	24.31	23.65	1.96
Rack (%)	2.13	2.10	1.93	1.79	1.80	0.23

$^{a, b, c}$ means in a row with no common superscript(s) differ significantly (P<0.05), SEM – standard error of mean, PLM – Pawpaw leaf meal.

From the results obtained in this study, it is therefore concluded that feeding pawpaw leaf meal at 10% inclusion level improved the growth performance of rabbits. Pawpaw leaf meal is therefore a suitable ingredient in feeding rabbits. Further research is advocated with to determine the highest quantity that the rabbits can tolerate.

References

Aderinola, O.A., Ojebiyi, O.O., Rafiu, T.A., Adepoju, L.O., 2008. Performance evaluation of growing rabbit fed diets containing varying inclusion levels of Centrosema pubescens or Calapogonium mucunoides in the savannah zone of Nigeria. 9th World Rabbit Congress – June 10-13, Verona – Italy. 525-528.

Aduku, A.O., Olukosi, J.O., 1990. Rabbit management in the tropics. Abuja; Living Books Series, G.U. Publications: 1 – 88.

Bitto, I.I., Arubi, J.A., Gumel, A.A., 2006. Reproductive tract morphometry and some haematological characteristics of female rabbits fed Pawpaw peel meal based diets. Afr. J. Biomed. Res., 9, 199 – 204.

Biya, A.J., Kannan, A., Morgan, M., Murugan, M., Anil, K.S., 2008. Effect of different feeding systems on the carcass characteristic of New Zealand white rabbits. A M.V.sc. thesis submitted to Kerala Agricultural University.

De Toledo, G.S.P., da Silva, L.P., de Quadros, A.R.B., Retore, M., Araújo, I.G., Brum, H.S., Ferreira, P., Melchior, R., 2008. Productive performance of rabbits fed with diets containing ramie (Boehmeria nivea) hay in substitution to alfalfa (Medicago sativa) hay. 9th World Rabbit Congress – June 10-13, Verona, Italy 827.

Iyeghe-Erakpotobor, G.T., Aliyu, R., Uguru1, J., 2006. Evaluation of concentrate, grass and legume combinations on performance and nutrient digestibility of grower rabbits under tropical conditions. Afr. J. Biotechnol., 4(20), 2004-2008. http://www.academicjournals.org/AJB

Leng, R.A., 2008. Digestion in the rabbit. In: MEKARN Workshop. Retrieved 5th June, 2009, from http://www.mekarnworkshop.com

Nodu, M.B., Okpeku, M., Abezi, A.E., 2014. Heamatological characteristics of young rabbits fed a mixture of Alchornea cordifolia/Pawpaw leaf meal. IOSR Journal of Agriculture and Veterinary Science (IOSR-JAVS) e-ISSN: 2319-2380, p-ISSN: 2319-2372. 7(1), Ver. IV (Feb), 92-96 Nigeria 10.9790/2380-07149296.

Nuhu, F., 2010. Effect of Moringa leaf meal (MOLM) on nutrient digestibility, growth, carcass and blood indices of weaner rabbits. A thesis submitted to the School of Graduate Studies, Kwame Nkrumah University of Science and Technology, Kumasi, in partial fulfilment of the requirements for the award of Master of Science degree in Animal Nutrition.

Ojebiyi, O.O., Farinu, G.O., Babatunde, G.M., Aderinola, O.A., 2008. Evaluation of the nutritive potential of cassava (manihot esculenta crantz) peels-blood meal mixture on the performance characteristics of female growing rabbits in the derived savannah zone of Nigeria 9th world rabbit congress – june 10-13, Verona – Italy 769.

Omoikhoje, S.O., Bamgbose, A.M., Aruna, M.B., Animashahun, R.A., 2006. Response of weaner rabbits to concentrate supplemented with varying levels of Syndrella nodiflora forage. Pak. J. Nutr., (6), 577-679.

Onyimonyi, A.E., Onu, E., 2009. An assessment of paw-paw leaf meal as protein ingredient for finishing broiler. Int. J. Poult. Sci., 8(10), 995-998.

How to cite this article: Saulawa, L.A., Sabo, M.N., Garba, M.G., 2015. Performance of weaner rabbits fed diets supplemented with Pawpaw (Carica Papaya) leaf meal. Scientific Journal of Animal Science, 4(12), 187-191.