Replacement value of cassava (*Manihot esculenta*) peel meal for maize on growth performance and profitability of female rabbits

[1*]Pascal O. Ozung, [1]Magnus I. Anya, [1]Esther D. Izuki and [2]Immanuel I. Bitto
[1]Department of Animal Science, University of Calabar, Calabar, Nigeria.
[2]Department of Animal Breeding & Physiology, University of Agriculture, Makurdi, Nigeria.
* Corresponding author: pascalozung@yahoo.com; ozungpascal@unical.edu.ng

Abstract

The effect of different replacement levels of sundried cassava peel meal (SCPM) for maize on growth performance and profitability of female rabbits (does) was investigated. Forty crossbred rabbits between the ages of 10 and11 weeks old and weighing between 1030±0.05 and 1088±0.02 g were randomly allotted to four dietary treatments (i.e. 10 does per treatment in 5 replicates of 2 rabbits each) after weight equalization. The replacement ratios were 100:0, 75: 25, 50: 50 and 25: 75% maize: SCPM for T_1, T_2, T_3 and T_4, respectively. The feeding trial lasted for 60 days during which growth and economics of production parameters were monitored. Results showed no significant ($P > 0.05$) influence of dietary treatments on daily weight gain, daily feed intake and feed conversion ratio. Feed cost decreases as CPM levels increased in the diets, while the gross profit increases as the levels of SCPM increased in the diets. The study concluded that SCPM could replace maize in diets of rabbits up to 75 percent, without deleterious effects on growth performance characteristics, with the added benefit of cost effectiveness and profitability.

Keywords: Alternative feed, performance, profit, rabbit

Introduction

In developing climes, the state of nutrition of the poor masses is predominantly marked by inadequate protein intake both in quality and quantity (Taiwo *et al.*, 2005). The meat consumption rate has abysmally fallen below the recommended standards (27g per caput/day) (Aduku and Olukosi, 1990) associated with the rise in price of animal protein and malnutrition. An annual five to seven percent growth rates for meat consumption has been estimated in the tropics (Oluyemi and Roberts, 2013). Such growth rates are not attainable with the large animals in view of their slow production cycles, but may however be met by short cycle animals like rabbits (Ozung, 2016).

The domestic rabbit feeds on forages, grains and hay (Aduku and Olukosi, 1990). Most diets of rabbits consist almost entirely of ingredients from plant sources (Raharjo *et al.*, 1986, Ozung *et al.*, 2017)) and agro-industrial by-products (Ijaiya *et al.*, 2005). One of such by-products consumed by rabbits is cassava peel meal (Omole and Ajayi; 1986). Cassava peel meal is an emerging and non-conventional feedstuff for rabbits (Aduku and Olukosi, 1990; Effiong, 2016). It could serve as a cheap source of energy for farm animals but should be fortified with additional protein source because of its low protein level. Cassava peel meal has been successfully included in animal feeding trials with no adverse effects on performance (Aduku and Olukosi, 1990). Fermented and sundried cassava peel meal (CPM) have been found useful as feed ingredients in the diets meant for swine and rabbits (Ogidi, 1998; Ijaiya *et al.*, 2005).

However, there is paucity of specific research information on the effect of sun dried cassava peel meal on performance of female rabbits. This study was therefore designed to determine the growth performance and profitability of feeding female rabbits (does) with sundried CPM as replacement for maize.

Materials and methods

Location of study

The study was carried out at a standard rabbitry at the Teaching and Research Farm, University of Agriculture, Makurdi. According to Kogbe *et al.* (1978), Makurdi is located on longitude $8^0 31^1$ East of the equator and latitude 7^0 45^1 North of the Greenwich meridian; 90 metres above sea level. Makurdi has a tropical climate with distinct wet (rainy) and dry seasons. The wet season (April-October) has a well-distributed rainfall with a monthly average of 155.53 mm and an annual average of 1244.30 mm, with a peak in July/August. The dry season (November-March) has little or no rain. Mean monthly relative humidity at 12:00 GMT range from 66 - 88% in the rainy season and 15 - 40% in the dry season with a mean value of 60%. The mean daily temperature of Makurdi varies from 15.6^0C in December/January to 38^0C February/March, with an annual mean value of 27.5^0C.

Experimental animals and management

Forty female crossbred rabbits between 10 and 11 weeks old, weighing between 1030±0.05 and 1088±0.02 g were used in the study. The rabbits were dewormed using piperazine and given a dose of Ivomec medication against ecto-and endo-parasites. The rabbits were further protected against microbial infection using an antibacterial and anti- protozoan preparation, Oxytrox (long acting oxytetracycline brand), a broad-spectrum antibiotic to curb diarrhea/enteritis.

Housing and equipment

The animals were housed in wooden cages measuring 60 × 60 × 50 cm and raised 1m above the ground as outlined by Oko *et al*. (2018). The cages were thoroughly washed and disinfected with saponated cresol (Izal) and allowed to dry for 7 days before the animals were brought in. The wooden cages were roofed with corrugated sheets, over which a grass thatch shade was constructed to keep out direct sunlight and lower ambient temperature as recommended by Aduku and Olukosi (1990). The rabbits were caged in clearly marked cages and given a weighed amount of feed daily while clean drinking water was provided *ad libitum*. They were allowed to acclimatize for two weeks on the control diet before the commencement of the feeding trial, which lasted for 60 days.

Experimental diets

Four (4) experimental diets were formulated with the replacement ratios of 100:0, 75:25, 50:50 and 25: 75% maize: sundried CPM, respectively. The dietary treatments were designated as T_1, T_2, T_3 and T_4 respectively. Treatment 1 served as the control diet. The gross composition of experimental diets is presented in Table 1. The proximate chemical analysis was done as outlined by AOAC (2000).

Experimental design

The rabbits were randomly allotted to dietary treatments using the completely randomized design (CRD) after weight equalization. There were 10 does per treatment in 5 replicates of 2 rabbits each.

Feeding of animals/ feed intake

The rabbits were fed in the morning hours between 7: 00 and 8: 00am with a weighed amount of feeds daily and had access to fresh and clean drinking water *ad libitum*. Left over feeds were collected into clearly labeled envelopes and weighed using a digital balance (Mettler scale) (minimum sensitivity of 0.1 g). The feed intake was computed by deducting from the quantity served, the weight of the left over.

Weighing of animals / body weight changes

The rabbits were weighed individually at the beginning of the study and weekly thereafter using a sensitive weighing scale. Body weight changes were determined by difference.

Feed conversion ratio

The feed conversion ratio was calculated as the ratio of feed intake to live weight gain.

Slaughtering

At the end of the feeding trial, twenty rabbits (five per treatment) whose body weight were closed or similar to the average weight of rabbits per treatment were randomly selected and taken to the laboratory for slaughtering by stunning as described by Aduku and Olukosi (1990); after they had been starved for twelve (12) hours but had access to adequate drinking water (Bitto *et al*., 2006). Each rabbit was weighed before slaughtering.

Economics of production

The cost per kilogram of each experimental diet was determined by calculating the cost per kilogram of each ingredient used in the study and multiplied by the levels of replacement. The cost of feeding the rabbits on a daily basis was computed by multiplying the cost per kilogram of diet by the amount consumed. And the total cost of feed per kilogram weight gain was obtained by dividing the weight gain by cost of feed.

Statistical analysis

Results obtained from the study were subjected to one - way analysis of variance (ANOVA) as described by Steel and Torrie (1980) for Completely Randomized Design (CRD). Significant means were separated using Duncan Multiple Range Test (DMRT) (Duncan, 1955).

Results and discussion

The energy content of diets ranged from 2,438 to 2,822 Kcal/ Kg Digestible energy (Table 1). The energy content decreased with increasing levels of sundried cassava peel meal in the diets. The energy content was slightly higher than the recommended level of 2400 Kcal/ Kg (Lebas, 1980). There was however, no evidence of any harmful effects on the rabbits; as slight excesses of energy have been reported to cause no deleterious effects on rabbits, except for extra deposition of fats (Esonu, 2000).

The proximate chemical composition (Table 2) of cassava peel meal, maize, full fat soybean, rice husks and brewers dried grains recorded in this study showed comparable values in crude protein, crude fibre, ether extract, ash and Nitrogen free extract with the values reported by Esonu (2000); Omole *et al*. (2005). Cassava peel meal has lower protein and higher fibre content than maize, hence, the need to fortify cassava peel meal diets with additional protein sources for better utilization by weaner rabbits. The crude protein content of diets (15 to 16 %) was within the recommended level of 16-18% for weaner rabbits under tropical conditions, as recommended by Omole (1982); Ozung *et al.* (2017) and Ozung *et al.* (2019). The crude fibre level ranges from 14 to 16% and similar to the 14 percent reported by Lebas (1980). The fat content of the diets (2 to 6 percent) was within the recommended level of 3% for growing rabbits (Lebas 1980).

The average daily feed intake (ADF) obtained in this study ranged from 47.04±4.23 - 52.14± 3.11 g/rabbit/day (Table 3). The ADF values are comparable to the results obtained by Ikurior and Akem (1993), who reported a daily feed intake range of 50.09 - 56.78 g/rabbit/day when they fed brewers yeast slurry and cassava root meal based diets to rabbits. The ADF values obtained in this study were slightly lower than the results of Anthony (2002) who fed *Tridax procumbens* in cassava based rations to growing rabbits, with a range of 52.96 - 58.87 g/ rabbits/day. The low values obtained in this study may be attributed to the dusty and powdery characteristic of cassava peel meal and also due to its high contents of ash and crude fibre, which may limit intake. Results for ADF were not significantly ($P > 0.05$) affected by dietary treatments.

The fluctuation in ADF with increasing levels of CPM in the diets could be attributed to the high-energy content of the diets. This is because growing rabbits can adjust their voluntary feed intake in response to dietary energy density and fibre levels (Scholaut, 1987). Average daily feed intake (ADF) values obtained in this study showed that 75% sundried cassava peel meal in diets fed to female rabbits produced weight gain equal to rabbits fed the control diet. These results however, contradicted the findings of Ijaiya *et al.* (2005) who reported that feed intake was higher in diets with more than 50% fermented CPM compared with the control (100% maize). This disparity in feed intake by rabbits could be attributed to fibre level in diets and nature of test ingredient (i.e. fermented or sundried CPM). The average daily weight gain (ADG) obtained in this study did not show any significant difference ($P > 0.05$) between dietary treatments (Table 3). The values obtained were 8.97±0.78 - 12.11± 0.64 g/rabbit/day. The ADG values are similar to the findings of Attah and Ekpenyong (1998); Anugwa *et al.* (1998); Ijaiya *et al.* (2005), who recorded 9.90 - 11.50 g/rabbit/day; 7.37 - 12.66 g/rabbit/day and 7.53 - 12.23 g/rabbit/day respectively as ADG values for various cassava based studies with growing rabbits. However, Aduku *et al.* (1988) found the growth rate of rabbits to be between 18 and 20 g/rabbit/day in Nigeria. Furthermore, the ADG values were comparable to the range of 6.19 – 16.63 g/rabbit reported by Ozung (2016) who fed processed cocoa pod husk meal diets to rabbits. Feed conversion ratio (FCR) in this study was in the range of 4.41 – 5.78 with no significant difference ($P > 0.05$) between treatments (Table 3).

These values are within the range of 3.39 - 8.53 reported by Ijaiya *et al.* (2005), who fed up to 100% fermented CPM to weaned rabbits. Female rabbits fed with the control diet (100% maize) recorded the lowest FCR compared to other rabbits fed the diets with varying levels of SCPM. Thus, indicating higher weight gain per unit of feed consumed for rabbits fed the control diet. A much lower range of FCR, 2.62-4.78 had been reported by Anthony (2002) who fed mixtures of *Tridax procumbens* and cassava root meal to growing rabbits. This could be attributed to better utilization of the diets resulting from the inclusion of *Tridax procumbens* in the study.

The zero mortality recorded in this study showed that sundried cassava peel meal (SCPM) had no deleterious effect on the performance characteristics of female rabbits (Table 3). This may be due to the fact that the residual cyanide in the sundried CPM was probably rapidly detoxified by rhodanase of the liver (Ijaiya *et al.,* 2005). The same workers reported that the rabbit liver contains 8 – 9 mg/g rhodanase, which is surpassed only by the rhodanase content of the rat's liver, which is 14 – 28mg/g.

The reduction in cost per kilogram of diet observed as the level of cassava peel meal increased was mainly due to the low cost of processing the cassava peels since they were obtained at no cost (Table 4). Cost incurred was largely due to transportation and milling. Increasing the level of sundried cassava peel meal in the diets also reduced the quantities of maize and brewers dried grains, which were major cost contributors to the diets. These factors explain the significant reduction in the cost of feed per kilogram of diet. The average cost of feeding the female rabbits for the period showed a steady decline as the levels of SCPM increased in diets. The least cost was observed in rabbits fed the diet with 75% SCPM. The highest cost of feed per daily weight gain was for diet 2 (75% maize: 25% SCPM) and the lowest cost was observed in diet 4 (25% maize: 75% SCPM). The gross profit recorded in this study increased with increasing levels of SCPM in the diets. The highest profit margin was recorded in rabbits fed diet 4 (75% replacement) (Table 5).

Since the prime objective of incorporating SCPM in the diet of rabbits is that of reducing cost of feed, replacing maize portion of the diet by sundried CPM did not only reduce the cost of the feed but was also found to be cost effective and profit yielding. This agrees with earlier findings by Agunbiade *et al.* (2001), Ijaiya *et al.* (2005), Okoye *et al.* (2006) and Anthony (2002) who reported the replacement of maize with SCPM in the diets of rabbits to be cost-effective and profitable.

Conclusion

There is high cost of production associated with the use of cereal grains like sorghum and maize as energy sources in diets for non-ruminant animals and pseudo- ruminants. To minimize cost and maximize profit, researchers have been exploring cheaper alternative energy sources including sundried cassava peel meal to replace these cereal grains. Cassava peel meal when fortified with protein sources like full fat soybean meal can support optimum growth performance of female rabbits with no adverse effects. The feed cost reduced with increasing levels of sundried CPM in diets, thus resulting in low cost of feeding and higher profit obtained in the 75% diet over others.

Recommendation

From all indications and within the experimental conditions of this study, the diet 4 (75% SCPM replacement) appears to have had optimum growth performance and the lowest feeding cost compared to the other diets. It is therefore recommended that farmers can replace up to 75% sundried cassava peel meal in maize based diets for rabbits. However, further research may be necessary to determine the actual level of residual cyanide in sundried CPM.

References

Aduku, A. O., Dim, N. I. & Aganga, A. A. (1988). Note on comparative evaluation of palm kernel meal, peanut meal and sunflower meal in diets for weanling rabbits. *Journal of Applied Rabbit Research*, 11:264 – 265.

Aduku, A. O. & Olukosi, J. O. (1990). *Rabbits Management in the Tropics: production, processing, utilization, marketing, economics, practical training, research and prospects*. Living Books GU Publication, Abuja, FCT, 150Pp.

Agunbiade, J. A., Fasina, O. E., Adeyemi, O.A. & Bagbe, S.A. (2001). Fortified cassava peel meal in balanced diets for rabbits. *Proceeding of the 26th Annual Conference of the Nigerian Society for Animal Production* (NSAP), Ahmadu Bello University, Zaria, Pp. 148 – 150.

Anthony, T. A. (2002). Utilization of *Tridax Procumbens* in cassava-based rations by growing rabbits. M.Sc. Thesis, Department of Animal producti -on, University of Agriculture, Makurdi, 189Pp.

Anugwa, F. O. I., Adesina, M & Ikurior, S. A. (1998). Effect of dietary crude fibre levels on performance, nutrient digestibility and carcass characteristics of weanling- growing rabbits. *Proceedings of the Silver Anniversary Conference of the Nigeria Society for Animal Production and the Inaugural Conference of the West African Society for Animal Production*, Abeokuta – Nigeria, Pp. 610 – 611.

Attah, S. & Ekpenyong, T. E. (1998). Performance of growing rabbits as influenced by diets containing sodium hydroxide treated and untreated rice husk. *Proceedings of the Silver Anniversary Conference of the Nigerian Society for Animal Production and the Inaugural Conference of the West African Society for Animal Production*, Adset / CASLP (Abeokuta-Nigeria), Pp. 608-609.

AOAC (2000). Association of Official Analytical Chemists. *Official Methods of Analysis*. 16th Edition, Washington D. C.

Bitto, I. I., Arubi, J. A. & Gumel, A.A. (2006). Reproductive tract morphometry and some haematological characteristics of female rabbits fed pawpaw meal based diets. *African Journal of Biomedical Research*, 9: 199 - 204.

Duncan, D. B. (1955). Multiple Ranges and Multiple F – Tests. *Biometrics* 11: 1 – 12.

Effiong, E. E. (2016). Physiological characteristics of rabbits fed diets containing cassava peel meal as replacement for maize. Ph.D Thesis, Department of Animal Science, University of Calabar, Calabar, 217Pp.

Esonu, B. O. (2000). *Animal Nutrition and Feeding. A Functional Approach*. Rukzeal and Rukson Associates, Memory Press, Owerri – Nigeria.

Fielding, D. (1991). *Rabbits. Tropical Agriculturist*, CTA, the Netherlands, 103Pp.

Ikurior, S.A. & Akem, J.D. (1993). Replacing maize with cassava root meal or its mixture with brewer yeast slurry in rabbit diets. *Nigerian Journal of Animal Production*, 25(1): 31– 35.

Ijaiya, A.T., Fasanya, O. O. A. & Ayanwale, B. A. (2005). Growth performance of weaner rabbits fed graded levels of maize and fermented cassava peel meal based diets. *Journal of Sustainable Tropical Agricultural Research*, 14: 114 – 117.

Kogbe, G.A., Tokarrkis, A., Ofigguk, D. & Wozny, D.E. (1978). Geology of Makurdi in middle Benue Valley, Sheet 25, Occasional publication, No.5, Dept. of Geology, ABU, Zaria, Nigeria.

Lebas, F. (1980). Nutrient requirements of rabbits. *Journal of Applied Rabbit Research*, 3 (2): 15 – 20.

Ogidi, A. T. (1998). The effect of replacing sorghum (*Sorghum bicolor* L. Moench) with fermented cassava peel meal (*Manihot esculenta* Crantz) on the growth performance of rabbits (*Oryctolagus cunniculus*). B. Tech. Thesis, Federal University of Technology, Minna.

Oko, O. O. K., Ozung, P. O., Anya, M. I., Agiang, E. A. & Evans, E. I. (2018). Carcass yield and gastro - intestinal tract morphometry of rabbits exposed to dietary cocoa (*Theobroma cacao* L.) pod husk meal. *Nigerian Journal of Animal Production*, 45(5): 84 – 91.

Okoye, F. C., Ugwuene, M. C. & Mbarah, J. U. (2006). Effects of local spices on the utilization of cassava peel meal – based diets by weaner rabbits. *Pakistan Journal of Nutrition*, 5 (3): 203 - 205.

Oluyemi, J. A. & Roberts, F. A. (2013). *Poultry production in warm wet climates*, revised edition, Spectrum Books Limited, Ibadan, 244Pp.

Omole, T. A. (1982). The effect of dietary protein on growth and reproductive performance in rabbits. *Journal of Applied Rabbit Research*, 23 (4): 729 - 737.

Omole, T. A. & Ajayi, T. (1986). Evaluation of brewers' dried grains in diets of growing rabbits. *Journal of Applied Rabbit Research*, 5: 83 – 88.

Omole, A. J., Omueti, O. & Ogunleke, O. J. (2005). Performance characteristics of weaned rabbits fed graded levels of dry cassava peel meal fortified with soy corn residue based diets. *Journal of Food,* *Agriculture and Environment*, 3(3&4): 36 – 38.

Ozung, P.O. (2016). Performance and physiological responses of rabbits to processed cocoa (*Theobroma Cacao* L.) pod husk meal (CPHM) – based diets. Ph.D Thesis, Department of Animal Science, University of Calabar, Calabar, 269Pp.

Ozung, P.O., Oko, O. O. K., Agiang, E. A., Eburu,P. O. Evans, E. I. & Ewa, C. E (2017). Growth performance and apparent nutrient digestibility co-efficients of weaned rabbits fed diets containing different forms of cocoa pod husk meal. *Agricultural and Food Sciences Research*, 4(1): 8 – 19. DOI: 10.2448/journal.512.2017.41.8.19.

Ozung, P.O., Kennedy, O.O.O., Ubua, J.A.& Agiang, E. A. (2019). Dietary cocoa pod husk meal could influence the reproductive tract morphometry of rabbits. *East African Scholars Journal of Agriculture and Life Sciences*, 2(1): 26 - 30. http://www.Easpublisher.com/easjals/.

Raharjo, Y. C., Cheeke, P.R., Patton, N.M. & Supriyati, K. (1986). Evaluation of tropical forages and by – products of feeds for rabbit production, nutrient digestibility and effect of heat treatment. *Journal of Applied Rabbit Research*, 9: 56 – 61.

Scholaut, W. (1987). Nutritional needs and feeding of German Angora rabbits. *Journal of Applied Rabbit Research*, 10: 111 – 121.

Steel, R.G.D. and Torrie, J. H. (1980). *Principles and Procedures of Statistics. A Biometrical approach.* 2nd edition, McGraw- Hill Book Co. Inc. New York.

Taiwo, A. A., Adejuyigbe, A. D., Adebowale, E. A., Oshotan, J.S. & David, O.O. (2005). Performance and nutrient digestibility of weaned rabbits fed forages supplemented with concentrates. *Nigerian Journal of Animal Production*, 32 (1):74 – 78.

Table 1. Gross composition of experimental diets (% dry matter basis)

Ingredients	**T_1 0% SCPM**	**T_2 25% SCPM**	**T_3 50% SCPM**	**T_4 75% SCPM**
Maize	50.00	37.50	25.00	12.50
*SCPM	0.00	12.50	25.00	37.50
Full fat Soybean	20.00	25.00	26.00	30.00
Rice husks	15.00	15.00	14.00	13.00
Brewers dried grains	11.65	6.65	6.65	3.65
Bone meal	3.00	3.00	3.00	3.00
Min. Vit. Premix	0.10	0.10	0.10	0.10
Salt	0.25	0.25	0.25	0.25
Sucrose	0.10	0.10	0.10	0.10
Total	**100.00**	**100.00**	**100.00**	**100.00**
Cal. Crude protein (%)	16.34	16.42	16.18	16.30
Determined analysis (%)				
Dry matter	91.62	87.00	91.00	87.50
Crude protein	16.03	15.23	16.73	16.84
Crude fibre	14.29	16.53	16.24	14.26
Ether extract	5.73	1.91	2.37	1.93
Ash	9.30	8.53	8.37	7.35
NFE	54.65	57.80	56.29	59.62
ME (Kcal/kg)	2,822.67	2,712.92	2,555.77	2,438.52

*SCPM: Sundried cassava peel meal SCPM replaced maize in the diets at varying levels

Table 2. Proximate and energy composition of sundried cassava peel meal, maize, full fat soybean, rice husks and brewers dried grains (% dry matter basis)

Ingredients	Crude protein	Ether extract	Crude fibre	Ash	NFE	DE* (Kcal/kg)
SCPM*	4.06	5.36	8.77	6.65	60.46	2030
Maize	8.16	3.97	2.52	1.32	71.08	3440
Full fat soybean	36.75	17.33	9.34	4.83	23.91	3310
Rice husks	7.25	8.40	23.97	10.25	18.69	1400
Brewers dried grains	19.69	10.64	10.58	3.49	15.62	1980

NFE: Nitrogen Free Extract
DE*(Kcal/Kg): Digestible energy, values obtained from Nutrients Composition Tables

Table 3. Performance of growing rabbits fed replacement levels of cassava peel meal for Maize (x±s.e.m)

Performance trait	T_1 0% SCPM	T_2 25% SCPM	T_3 50% SCPM	T_4 75%SCPM
No. of rabbits/diet	10	10	10	10
Initial live weight (g)	1078±101.97	1030±97.59	1088±74.26	1060±56.21
Final live weight (g)	1906±63.81	1674±106.70	1700±59.06	1702±11.77
Total weight gain (g)	828±62.37	644±112.30	612±61.41	642±97.37
Average daily feed intake (g)	52.14±3.11	47.04±2.30	50.58±2.64	48.80±3.85
Average daily weight gain (g)	12.11±0.64	9.42±1.52	8.97±0.78	9.55±1.57
Feed conversion ratio (FCR)	4.41	5.62	5.78	5.69
Mortality (%)	0	0	0	0

S.E.M = Standard Error of mean
Means on the same row are not significantly different (P>0.05).

Table 4. Economics of producing female rabbits with cassava peel meal as replacement for maize

Parameter	**T_1** 0% SCPM	**T_2** 25% SCPM	**T3** 50% SCPM	**T_4** 75% SCPM	**SEM**
Cost/kg of diet (₦)	26.60	24.90	21.68	19.63	3.32
F C R	4.41	5.62	5.78	5.69	0.32
Av. cost of feeding (₦) for 60 days	99.63	81.37	75.48	65.10	7.24
Cost/kg live weight gain (₦)	117.31	139.94	125.31	111.69	6.13
Gross profit (₦)*	50.37	68.63	74.52	84.90	7.24

S. E. M = Standard Error of Mean, Cost per weaner rabbit = ₦ 700

Selling price per table rabbit = ₦ 2500, * Gross profit = Selling price – Cost of production

Cost of production = cost of weaner rabbit + cost of feeding + cost of transportation.