ACADEMIC INN INTERNATIONAL

ISSN: 2663-9513 (Online) ISSN: 2663-9505 (Print)

South Asian Journal of BIOLOGICAL RESEARCH

open access

GROWTH RESPONSE AND CARCASS YIELD OF RABBIT FED DIETS CONTAINING SUPPLEMENTED POULTRY GROWTH PROMOTERS

Oyinbo, Emmanuel Oluuwasina and David Terhemba Shaahu

To cite the article: Oyinbo, Emmanuel Oluuwasina and David Terhemba Shaahu (2020). Growth Response and Carcass Yield of Rabbit Fed Diets Containing Supplemented Poultry Growth Promoters, *South Asian Journal of Biological Research*, 3 (1): 45-54.

Link to this article: http://aiipub.com/journals/sajbr-200601-031154/

Article QR **Journal QR**

GROWTH RESPONSE AND CARCASS YIELD OF RABBIT FED DIETS CONTAINING SUPPLEMENTED POULTRY GROWTH PROMOTERS

Oyinbo, Emmanuel Oluuwasina and David Terhemba Shaahu

Department of Animal Production and Management, College of Animal Science, Federal University of Agriculture, P.M.B 2373 Makurdi, Benue State

Corresponding Author: oyinboemmanueloluwasina@gmail.com

Tel.: +2348165640835

A R T I C L E I N F O

Article Type: Research

Received: 26, May. 2020.

Accepted: 08, June. 2020.

Published: 09, June. 2020.

Keywords:

Growth Promoters, Growth Performance, Rabbit, Agro-Allied By-Product, Cost Analysis

A B S T R A C T

The study was carried out to examine the effect of poultry growth promoter supplementation on fattening rabbits' growth performance, as well as carcass characteristics.Twenty unknown breeds of rabbit weaned rabbits were purchased and randomly assigned to 4 dietary groups at the rate one rabbit per hutch. Each of the four groups was assigned to different treatment diet (T1, T2, T3 and T4) consisting of non-inclusion (control), el-rox, glofast and maxgrowth as commercial growth promoters. The feeding trial lasted for 91days. The poultry promoter was added as it was prescribed by the manufacturer for broiler. The experiment has a significant difference on the total feed intake (5836, 7235, 5755 and 5721) were reported for T1, T2, T3 and T4 respectively. For average daily feed intake and feed conversion ratio (fcr) T2 (el-rox growth promoter) showed higher values (79.51, 7.09) than in the control diet (64.13, 6.13) while values for T3 and T4 were lower indicating no positive effect. There was significant increase in weight gain as T3 T4 and T2 (111.90, 1084.00 and 1020.40) performed better than T1 (956.20) respectively. For live weight of organs, groups fed growth promoters (T3, T2 and T4) had higher values than the control (T1) except for small intestine, kidney and kidney fat where T1 had higher values (1.31, 0.58 and 0.96g) than other treatment groups. There was negative effect of growth promoter on GIT length as T1 (control) had higher values (2.98, 67.76 and 10.34cm) for oesophagus, small intestine and caecum than other treatment groups. For economics of production, cost of feed intake was lower in T1 than T2, T3 and T4 (293.93, 422.31, 335.99 and 334.60 respectively). Based on the results obtained in the present study, it can be concluded that the inclusion of poultry growth promoter has a positive effect on grower rabbit. It is therefore recommended that poultry growth promoter supplementation in rabbit feed can be a way to enhance growth for rabbit fattening. Further studies should be conducted to determine effect of poultry growth promoter on health of rabbit and also on human health when consumed as food.

1. INTRODUCTION

There is a rapid increase in world population with a decrease in cereal production, especially in developing countries. This current global food insecurity is worsened not only by the increased population growth in developing countries since, livestock's are also mostly fed with maize and rice grains, cassava tubers and other foodstuffs needed by man himself. This has created a great competition between man and animals for food especially cereal grains such as maize, Sorghum and wheat which are sources of energy for both man and livestock. This usually creates food shortages and so to eradicate hunger due to food shortage, the materials used to feed animals should be better used as only food for human diets (Jones *et al*., 1948 ,kim *et al*. 1992).

Cereal grains constitute the major sources of energy in poultry diets in the tropics. However, maize has remained the chief energy source in compounded diets and constitutes about 50% of poultry ration. Pressure on maize, wheat and recent cassava has been on the increase worldwide with the emphasis being placed on export and other diversified use mostly in flour-based foods and ethanol production as an alternative source of fuel.

These trends require serious diversification of energy feedstuff for poultry;the fact that feed alone accounts for 70 – 80% of the recurrent production input in intensive monogastric animal production makes the utilization of multiple feed ingredients expedient. In view of this threatening problem, several researchers have suggested the use of microorganisms for the bioconversion of waste materials of Agricultural origin into useful products, especially for livestock feeds (Bhalla and Joshi, 1994; Abu *et al*., 1998; Adeyemo *et al*., 1999, Nguyen et al. 2010).). Thus agro-allied by-product is waste from cereals. Such as brewers Dried Grain (bgd), Rice rice bran (rb), rice husk (rh), corn bran (cb), etc. from agro-allied product, useful products have been obtained. Agro-industrial products, such as palm kernel meal (pkm), and Cassava Peels (CP), have also been obtained. This Cereal waste is generally low in protein. However, for livestock sector of any agriculture economy to be sustained amidst acutes food shortage so as to boost animal protein intake worldwide, we must look for alternatives to cereals which are indigenous to our tropical environment. Among such alternatives are the use of agro-allied by-product, thus, It has been used as feeds for ruminants as well as poultry and other livestock (Iyayi and Aderolu, 2004).

Agro-industrial by-products is in abundance in Nigeria, so they are available at little or no cost. Thus, Increasing demand for animal protein and the economic hardship faced by the populace have stimulated greater interest in fast-growing animals with short generation intervals such as the rabbit (Aduku and Olukosi, 2000). With a better weight gain to meet up the demand of animal protein, this can best be achieved in short period of time by the use of growth promoters in rabbitry production. Growth promoters are used to help increase the efficiency of animal production by increasing weight gain and product output. All growth promoters in the United States have been approved by food administers (FDA) and has been proven to be safe for human consumption (Gadberry, 2009). Rabbit is well adapted to most environmentsand can subsist on a variety of kitchen waste while tolerating high fiber diet than poultry.Moreover , they breed all year –round and have short generation interval thereby enhancing profit for poor farmers while providing animal proteins for the developing countries, where rabbit can only be justified for human use (Iribeck,2001)compared with other meats such as beef, chicken, lamb , and pork ,it is high in protein and low in fat, cholesterol and sodium (cheeke *et al.*,1987, Dalle Zotte ,2000) Rabbit production which is a low capital intensive enterprise and can be started on small scale with very little space has the ability to convert forage and agro by-products into meat more efficiently than ruminants (Lebas *et al*., 1986 ,Hassan , W.A .and

Owolabi, R.O. 1996).

2. MATERIALS AND METHODS

2.1 Experimental location

The study was carried out at the Rabbitary Unit of The Livestock Teaching and Research Farm of the College of Animal Science, University of Agriculture, Makurdi, Benue State. Makurdi lies within the Guinea Savannah region of Nigeria and has two distinct seasons-the wet seasons which lasts from April to October with an annual rainfall that ranges from 1105mm to 1600mm and the dry season which lasts from November–March.

2.2 Preparation of Test Ingredient

The test ingredient used for this experiment was the maize, rice offal, brewed dry grain (BDG), maize offal and soya beans with the inclusion of commercials growth promoters which was the test material for the experiment, the growth promoter was gotten from the veterinary shop in Makurdi, and then used for formulation of experimental diets.

2.3 Animals and Housing

Twenty (20) mixed breeds growing rabbits from Dagwom Farm in the (National Veterinary Research Institute, Vom), were used for the study. The rabbits were kept individually in hutches covered with wire mesh of dimensions (40x60x40cm^3). An adaptation period of 7days was used to get the animals acclimatized to their experimental site. During the adaptation period, the animals were treated against ecto and endoparasites using *Ivermectin*® and also given Enrovet antibiotics. After balancing for the initial weight averaging 652.5g±5, the animals were grouped into four (4) and randomly allotted to the various dietary treatment. Each group constituted a treatment that was replicated five (5) times, using one rabbit as replicate in a CRD. The rabbits were fed and given water *ad-libitum* in aluminium drinkers so constructed to avoid wastage of feeds by the animals. The experimental design used to separate the rabbits into treatment groups was Completely Randomized Design.

2.4 Data Collection

The data collection on daily weight gain, daily feed intake and feed conversion ratio lasted for 91days. The initial weight of the rabbits was taken at the beginning of the feeding trial and subsequently at the interval of seven (7) days using a precision digital weighing balance. Feed intake was calculated weekly by subtracting the left-over feed at the end of the week from the total dry feed given from the beginning of the week.

(a) The daily weight gain (DWG) of each rabbit was determined using the formula below:

$$\mathbf{DWG} = \frac{\mathbf{finalweight(grams) - initialweight(grams)}}{\mathbf{91days}}$$

(b) The daily feed intake (DFI) was determined using the formula below:

$$\mathbf{DFI} = \frac{\mathbf{Totalfeedconsumed\ (grams)}}{\mathbf{91days}}$$

(c) The feed conversion ratio of the rabbits was determined using the formula below:

$$\mathbf{FCR} = \frac{\mathbf{Totalfeedconsumed\ (grams)}}{\mathbf{totalweightgained\ (grams)}}$$

(d) The cost efficiency (Naira per kilogram weight gain) of each experimental rabbit was also calculated by using the cost of feed consumed for 91days ÷ total weight gained

2.5 Economy of Feed Conversion

The cost per kilogram feed and the cost of processing of each experimental diet were determined based on the current prices of feed ingredients in Makurdi. The cost of feeding the rabbits on a particular diet for the period of the study was also calculated as the product of the cost per kilogram of the diet and feed intake. Feed cost/kg weight gain was also calculated by dividing the cost of feed intake/rabbit (₦) by the average total weight gain (kg). The net profit was computed as the selling price of table rabbit less the total cost of production. Consideration was given to cost of medication, labour and depreciation of asset (housing, feeder and drinker)

2.6 Statistical Analysis: All data obtained were subjected to analysis of variance (ANOVA) using Minitab Statistical Software Version 16. (2014).

3. RESULTS AND DISCUSSION

3.1 Experimental Diet

Four (4) iso-nitrogenous diets were formulated using conventional feedstuffs and commercial growth promoters was included at various inclusion levels of 0g, 50g/25kg , 50g/25kg , and 150g/25kg , in each diet.

3.2 Nutrient Composition of Experimental Diets

Diet 1 (T_1) which served as the control diet had 0g of the commercial promoter while diet T_2, T_3, T_4 had 50g, 50g and 150g of poultry commercial growth promoters, for optimum utilization of the diet compounded for the rabbits, experimental diets are presented in Table 1.

Table 1:Ingredients and Nutrient Composition of Experimental Diets (%)

Ingredients	T_1(control) (0g)	T_2(el-rox)(50g)	T_3(glo fast)(50g)	T_4(maxigrowth)(150g)
Maize	14.41	14.41	14.41	14.41
Maize offal	28.82	28.82	28.82	28.82
Rice Offal	14.41	14.41	14.41	14.41
Full Fat Soybean	10.74	10.74	10.74	10.74
Bdg	28.82	10.74	28.82	28.82
Salt	0.5	28.82	0.5	0.5
Premix	0.3	0.5	0.3	0.3
Bone meal	2	0.3	2	2

Numbers in the brackets are the growth promoter inclusion level according to manufacturer specification

3.3 Effect of Diet supplemented with poultry growth promoter on the performance of growing rabbits

Table 2: presents the growth performance of experimental rabbits. The initial body weight was balanced to remove bias, while the final weight gain and average daily weight gain (10.51 -12.30g/kg) on the parameter were similar (p>.0.05) among the treatment. This result agrees with the finding of Castellini*et al.*(1998) and Castellini*et al.*(2000) who administered vitamin E and vitamin C fattening rabbit's diets. The researcher observes that their no significant effect on the final body weight.The final weight of rabbit showed that rabbits fed growth promoters in diet reached highest weight than

the control diet. Among the treatment, rabbit fed glofast reached the highest weight compare to elrox and maxgrowth. These differences were however not significant (p>0.05).

The rabbit fed glofast had the highest (p< 0.05) daily weight gain of 12.20g/day while the rabbit fed the control diet gained the least (p>0.05) weight among the treatments.

The total feed intake and average daily feed intake showed a significant difference (p<0.05), among the treatment. This result did not agree with the result of Attia *et al.* (2011) who reported that supplementation with antioxidant properties resulted in a reduction of feed conversion ratio in growing rabbit from 5.64 to 4.23. The total feed intake, value for $T_2$was highest and varied significantly (P<0.05) from T_1 T_2, and T_4.There was a slight but not significant reduction in the feed intake of rabbits fed T_3 and T_4 compared to those fed T_1 diets. The feed intakes of rabbit fed T_2 diets were significantly higher than the rabbits fed the other diets.

Table 3: Performance of rabbits fed poultry supplemented growth promoter on the performance of growing rabbits

Parameters	T_1 (control)	T_2 (el-rox)	T_3 (glofast)	T_4 (maxigrowth)	SEM P-Value
Av. Initial Weight (g)	663.20	672.80	674.40	677.80	63.68 0.99
Av. Final Weight (g)	1620.40	1693.20	1793.60	1761.60	113.56 0.53
Total weight gain (g)	956.20	1020.40	1119.20	1084.00	119.57 0.56
Av. Daily Weight Gain (g)	10.51	11.21	12.30	11.91	1.31 0.56
Total feeds intake(g)	5836[b]	7235[a]	5755[b]	5731[b]	565.69 0.09
Av.Daily feed intake(g)	64.13[b]	79.51[a]	63.24[b]	62.98[b]	6.22 0.09
Feed Conversion ratio(g)	6.13	7.09	5.17	5.99	0.77 0.13

[ab] Mean on the same row with different superscripts are significantly different (p<0.05), Av. = Average, SEM = Standard Error of Mean, *= Significant difference (p<0.05)

3.4 Organ weight of rabbits fed diet supplemented with poultry growth promoter

Organ weight of rabbits fed diets containing poultry growth promoters is shown in Table 3. The result shows that the diet caused a significant (p<0.05) decrease in, large intestine weight, and caecum increases weight. Kidney fat, stomach and small intestine weight were declined due to growth promoters supplementation but the difference was not significant (p>0.05). This result was not in agreement with Peiretti and Meineri (2008) who fed graded level hesperidin supplemented to rabbit and did not observe any significantly influence on the animal carcass trait. There is no significant different (p>0.05) in T_1 , T_2, T_3, T_4 final weight and in another internal organ like heart, liver, lungs, kidney ,oesophagus, stomach small intestine, pancreas and spleen weight. Numerically rabbits fed $_{T3}$ diets had the heaviest heart (0.29%) while rabbits fed T_1, T_2, T_4 diet had similar heart weight of 0.21%, the Liver of the rabbit fed T_3 was observed to be heavier (2.27%) while those fed T_4 had higher liver weight. Rabbits fed T_1 and T_2 diet had the heaviest lungs weight (0.70%) while rabbits fed

T_3 diet had the least (0.55%) weight. Rabbits fed T_4 diet had the highest value for oesophagus weight (0.10%) while rabbits fed T_1 diet had the least value for oesophagus (0.08%) weight, while T_2 and T_3 were similar. The Small intestine was observed to be heavier (1.14%) in rabbits fed T_3 diet while it was lighter (0.99%) in rabbits fed T_2 diet. Rabbits fed growth promoter diet had the heaviest large intestine weight (1.24%) while rabbits fed the control diet had the least value of 0.90%. Rabbits fed T_2 and T_3diet had the heaviest caecum (1.16%) while rabbits fed T_1 diet had the least caecum weight of 0.86%. Rabbits fed T_2 diets had the heaviest increase weight of 0.07%while rabbits fed T_3 andT_4 diet had the least (0.05%).

Table 4: Organ weight of rabbits fed supplemented poultry growth promoters

Parameters expressed as % of Fasted Live Weight (g)	T_1 (control)	T_2 (el-rox	T_3 (glofast	T_4 (maxigrowth	SEM P-Value
Heart					0.03
	0.21	0.21	0.29	0.21	0.33
Liver					0.23
	2.22	2.16	2.27	2.06	0.93
Lungs					0.15
	0.70	0.70	0.55	0.67	0.88
Kidney					0.03
	0.58	0.51	0.57	0.50	0.29
Pancreas					0.02
	0.01	0.07	0.05	0.05	0.88
Oesophagus					0.02
	0.08	0.09	0.09	0.10	0.96
Stomach					0.06
	0.78	0.80	0.86	0.75	0.64
Small intestine					0.13
	1.31	0.99	1.24	0.94	0.36
Large intestine					0.09
	0.90^b	1.24^a	1.24^a	0.94^b	0.03
Caecum					0.86
	0.86^b	1.16^a	1.16^a	1.14^a	0.09
kidney fat					0.14
	0.96	0.68	0.60	0.06	0.34
Spleen					0.01
	0.04	0.04	0.05	0.05	0.60

[ab] Mean on the same row with different superscripts are significantly different ($p<0.05$), SEM = Standard Error of Mean, *= Significant difference ($p<0.05$).

4.0 CONCLUSION

A feeding trial was carried out with grower rabbits fed supplemented poultry growth promoter as based diets to evaluate its fed potential to rabbit fattening. The poultry promoter was gotten from the veterinary shop in the Makurdi metropolis in Benue State of Nigeria and it was added as a supplement

into 25kg of feeds used for T_2 ,T_3 ,T_4 as it was prescribed to poultry according to the manufacturers, except for the control. The rabbit was allotted experimental diet. The experimental rabbits were served the diet and provided drinking water *ad libitum* all through the 91-day feeding trial. Growth parameters were determined, the visceral organs examined and the gastro-intestinal morphometry evaluated and economic of production determined. This work shows that poultry growth promoter has no effect on the rabbit, since no mortality was recorded. Also, the rabbits fed diet with supplemented glofast (promoter) T_3 have higher final weight and body weight gain than others in the treatment. The large intestine and caecum of the rabbits fed with supplement diet poultry growth promoter were modified live to supplemented ration.The gastro-intestinal morphometry of the experimental rabbits was all similar irrespective of the dietary treatments, serve the small intestine length. Base on this finding, it recommended thatpoultry growth promoter T_3 (glofast) can be supplemented into rabbit diet as feeds additive for enhance growths of rabbits.Further studies should be conducted to determine the effect of poultry growth promoters on the health of rabbit and also on human health when the animal is consumed as food.

REFERENCES

Abu, O. A., Oguntimein, G.B., and Tewe, O. O. (1998). Protein enrichment of sweet potato by solid-state fermentation using four mono-culture fungi. *Nigerian Journal of Biotechnology* 9 (1): 170 -185.

Adeyemo, S. O., Akoma, O., and Adeyeye, A.A. (1999). Improvement of nutritional value of pomace from "Kunun-Zaki" production by fermentation with Candida Tropicalis.*Nigerian Journal of Biotechnology* 10(1): 55-9.

Aduku, A.O. and Olukosi, J.O. (2000). Animal products processing and handling in the tropics. 1st Edn, GU publishers, Abuja. Pp 52-117.

Attia, Y. A., Al-Hanoun, A. and Bovera, F. (2011). Effect of different levels of bee pollen on performance and blood profile of New Zealand White bucks and growth performance of their offspring during summer and winter months.*Journal of Animal Physiology Animal Nutrition*95:185-234.

Bhalla, T. C. and Joshi, M. (1994).Protein enrichment of apple pomace by coculture of cellulohyticmould and yeast.*World Journal of Microbiology and Biotechnology* 10(1):116-711

Castellini, C., Dal Bosco A., Berardini M., Cyril H.W. (1998). Effect of dietary vitamin E on oxidative stability of raw and cooked rabbit meat.*Meat Sci.,* 50: 153-161. *doi: 10.1016/S0309-17-26. doi: 10.1111/j.1439-0396.2009.00967.x*

Castellini, C., Dal Bosco, A. and Bernardini, M. (2000).Improvement of lipid stability of rabbit meat by vitamin E and C administration.*Journal of Science and Food Agriculture*, 81: 46-53.

Cheek, P.R., N.M. Patton, S.D. Lukefahr and McNitt, J. I. (1987). Rabbit production. The Interstate Printers and Publishers, Illinois, USA.

Dalle Zotte A 2000 , main factors influencing the rabbit carcass and meat quality .in processing of the 7th world Rabbit congress Valencia, spain ,pp1-32

Gadberry, S. (2009). Growth implants for suckling and growing beef cattle,cooperative Extension , University of Arkanasas , Little Rock ,Arkansas.

Hassan ,W.A. and Owolabi. R.O. 1996 production performance of domesticated rabbit in semi -arid zones of Nigeria. Processings of the world rabbit congress , Toulouse, france 3, 359-363

Iyayi, E. A. and Aderolu, Z. A. (2004).Enhancement of the feeding value of some agro-industrial

by-products for laying hens after their solid state fermentation with *Trichodermaviride. African Journal Biotechnology*, 3 (3): 182-185.

Jones, D.B., Caldwell, A. and Widness, K. D. (1948). Comparative growth promoting values of the proteins of cereal grains.*Journal of Nutrition* 35(6): 639-49.

Kim, Y.H., Moon, ,H. K., Cheng, Y. B., Bang, H. B and T. Y. (1992). The effect of feeding brewers, grain on the performance of growing and fattening pigs Annual Report , Livestocks Experiment station korea.

Lebas, F. P., Rouvier, R. and de Rochambeua, H. (1986). The rabbit Husbandry, Health and Production FAO Animal Production and Health Services United Nations, Rome.

Nguyen, T. A. D., Kim, K. R., Han, S. J., Cho, H. Y., Kim, J. W., Park, S. M. and Sim, S. J. (2010) Pretreatment of rice straw with ammonia and ionic liquid for lignocelluloses conversion to fermentable sugars. *Bioresou.r Technol.* 101:7432–7438

Peirettip.G. MeineriG. 2008 Effects on growth performance, carcass characteristics, and the fat and meat fatty acid profile of rabbits fed diets with chia salvia hispanica l seed supplement meat sci 80

Peirettip.G. MeineriG. 2008 Effects on growth performance, carcass characteristics, and the fat and meat fatty acid profile of rabbits fed diets with chia salvia hispanica l seed supplement meat sci 80.

This work is licensed under a Creative Commons Attribution 4.0 International License.