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Growth Performance and Carcass Characteristics of Weaner Rabbits Fed Graded Levels of Boiled *Senna occidentalis* Seed Meal

K. Mustapha, Y.S. Kudu and E.Z. Jiya
Department of Animal Production, Federal University of Technology, Minna
Corresponding author: K. Mustapha; E-mail: k.mustapha223@gmail.com

Abstract
Increasing cost remains a major impediment for use of quality feedstuff in the nutrition of animals in the Tropics. Conventional protein feedstuffs are the major unaffordable feedstuffs currently threatening production of rabbits. Therefore, the need for exploration of *Senna occidentalis* becomes desirable to reduce cost associated with production of rabbits for human consumption. This study aimed to establish this non-conventional feedstuff for feeding rabbit hence, forty five (45) mixed breeds weaned rabbits were used in the experiment which lasted for twelve weeks. The rabbits were randomly assigned to five (5) dietary treatments containing boiled *Senna occidentalis* seed meal (BSOSM) at 0.00 %, 2.50 %, 5.00 %, 7.50 % and 10.00 % inclusion levels. Data collected revealed significant ($p<0.05$) differences for feed intake, body weight gain, feed conversion ratio and carcass dressing percentage. Based on the outcomes of this study, it can be inferred that BSOSM is of good nutritional quality if the anti-nutritional factors are eliminated or reduced through boiled process as used in this experiment. It was also concluded that the use of BSOSM at 7.5 % inclusion levels in the diets of weaned rabbits should be encouraged because it has no harmful effect on growth performance and carcass characteristics.

Keywords: Rabbits, *Senna occidentalis,* carcass characteristics, feed

Introduction

The potential of livestock in extenuating the problem of protein insufficiencies in human nutrition in developing countries is becoming less accomplishable because of poor supply and increasing cost of feed ingredients. Inadequate supply and high cost of certain conventional feed ingredients such as soybean, groundnut and maize are reported to be responsible for non-optimal nutrition of animals which currently threatens animal productivity and performance (Ari, 2006). This high cost of conventional feed ingredients has necessitated the research into alternative feed ingredients that have high nutritive value, readily available, less expensive and of no use for human consumption such as senna coffee seeds (*Senna occidentalis*). The utilization of *Senna occidentalis* seed in livestock feed is not popular, because of lack of information about its nutritional qualities and the presence of anti-nutritional factors such as tannin, cyanide, phytates and saponin (Abdullahi *et al*., 2003). It has therefore become an absolutely essential to escalate research on different processing methods such as boiling with aim to annihilate the anti-nutritional factors to the barest minimum level.

There is need to jack up the production of protein of animal source in Nigeria. This is due to the fact that the large quantities of proteins consumed in Nigeria are of plant source and this sources lack one or more essential amino acids, whereas proteins of animal sources are balanced in amino acids (Aduku, 2004). The contributions of traditional livestock (cattle, sheep, goat and pig) to this national problem has been indeed marginal, providing help to only few Nigerian who mostly are urban dwellers (Ahamefule *et al.,* 2000).In order to meet up the animal protein requirement of Nigerian population, increased production of monogastric animals like rabbit is indispensably necessary because of their high productive potential and short generation interval (Ayanwale, 2006).

Materials and Methods

This experiment was carried out at the Rabbit unit of Animal Production Department Farm situated at main campus of Federal University of Technology, Minna, Niger State. Minna is located within latitude 09^0 30' and 09^0 45' north and longitude 06^0 30' and 06^0 45'east of the equator. The *Senna occidentalis* seeds used for this experiment were harvested from the matured seed pods along the road sides in Bida, Niger state. The pods were properly dried and threshed to obtain the seed. The sorted seeds were boiled. The method of Omoikhoje *et al.* (2009) was adopted. The method involves putting the cleaned seeds into heated water at 100^0C or 60 minutes. At this temperature, majority of the hard cotyledons of the seeds were expected to be softened. After which the boiled seeds were removed, put into a sieve to drain the water and later sun dried. After the boiled seeds have dried considerable (hard to break with hand). It was milled into fine particles by made used grinding engine equipped with 600µm mesh screen size.The ground BSOSM was mixed into rabbits rations at 0.00, 2.50, 5.00, 7.50 and 10.00 % inclusion level (Midala *et al*., 2013) designated T_1, T_2, T_3, T_4 and T_5 respectively (Table1).

The diets were pelleted by using pelleting machine equipped with 4 mm screen size. The rabbits were fed with the respective ration *ad-libitum* and water was also made available to all rabbits *ad-libitum*. Forty five rabbits were used for this experiment. The rabbits were randomly divided into five treatment groups. Each group comprised of nine rabbits.

Table 1:Feed composition and calculated nutrient values of the experimental diets

Parameters	T_1	T_2	T_3	T_4	T_5
Maize	36.00	36.50	37.00	37.00	37.50
Soybean	27.00	25.00	24.00	24.00	20.00
Blood meal	2.45	2.45	2.45	2.50	2.00
BSOSM	0.00	2.50	5.00	7.50	10.00
Rice offal	18.00	17.00	18.00	16.45	17.95
Maize offal	13.00	13.00	10.00	9.00	9.00
Bone meal	2.50	2.50	2.50	2.50	2.50
Premix	0.25	0.25	0.25	0.25	0.25
Salt	0.40	0.40	0.40	0.40	0.40
Methionine	0.20	0.20	0.20	0.20	0.20
Lysine	0.20	0.20	0.20	0.20	0.20
Total	100	100	100	100	100
Calculated	**analysis**				
Crude protein	18.05	18.02	18.03	18.05	18.00
Energy kcal/kg	2999.26	3000.05	3003.63	3002.78	3004.11
Crude fibre	11.43	11.27	11.24	10.97	11.12
Calcium	1.01	1.02	1.03	1.03	1.02
Phosphorus	0.62	0.60	0.61	0.62	0.59

Each group was further sub-divided into three, such that replicate groups of three rabbits were obtained for each sub-group with three rabbits per replicate. The rabbits were housed in cages and the cages were enclosed in a house. Before the commencement of the experiment, the rabbits were acclimatized for the period of five days, during this period; rabbits were all fed common diets. The rabbits were also treated against endo and ecto-parasites using sodex (dewormer) and ivomectin, respectively. In addition, medications were administered where necessary. The experiment lasted for the period of twelve weeks. The records of weekly body weight, weight gain and feed intake were kept while the feed conversion ratio was calculated.

The performance records of the animals were subjected to one-way analysis of variance (SAS, 2008 version 9.2) while Duncan multiple range test was used to separate the means.

Results and Discussion

The results of growth performance of the rabbits fed graded level ofBSOSM are presented in Table 2. The best performance in final body weight, average daily body weight gain and feed conversion ratio were recordedin those rabbits fed 7.5 % BSOSM whichcan be attributed to nutritional quality of BSOSM. This was in agreement with findings of Augustine *et al.* (2010) who reported that feeding of processed *Cassia obtusifolia* to broiler chickens increase weight gains and reduces feed conversion ratio. The average daily feed intake was gradually reduced as the levels of BSOSM increased in the diet which agreed with the findings of Yahaya (2014) who reported that the feed intake of guinea fowls decreased progressively as the levels BSOSM increased in the diet. The lowest final bodyweight recorded in those rabbits fed 10 % BSOSM could be as a result of lower feed intake which might be attributed to higher levels of anti-nutritional factors in BSOSM containing diet as reported by Midala *et al*. (2013). This is evidence that boiling did not completely remove the anti-nutritional factors in the foodstuff.

Table 2: Growth performance of weaner rabbits fed graded levels of pelleted BSOSM

Parameters	T_1	T_2	T_3	T_4	T_5	SEM
Init. body weight (g)	546.67^{a}	548.33^{a}	548.33^{a}	548.33^{a}	546.67^{a}	20.35
Final body weight (g)	1175.00^{bc}	1200.00^{bc}	1410.00^{ab}	1550.00^{a}	1053.30^{c}	119.42
ADWG (g)	7.48^{bc}	7.66^{bc}	10.26^{ab}	11.94^{a}	6.03^{c}	1.40
ADFI (g)	56.50^{a}	53.34^{b}	45.51^{c}	43.93^{c}	40.48^{d}	0.97
FCR	7.88^{c}	6.96^{bc}	4.47^{ab}	3.78^{a}	7.20^{c}	1.16

^{a,b,c} : means in the same row with different superscripts are significantly ($P < 0.05$) different, SEM: Standard Error of the Mean, ADWG: Average daily body weight gain, ADFI:Average daily feed intake, FCR: Feed conversion ratio.

The live and slaughter information of rabbits fed graded levels of BSOSM are presented in Table 3. The result revealed that the inclusion levels had effect on all parameters measured. The better performance in live weight, slaughter weight, empty body weight and dressed percentage observed in those rabbits fed 7.5 % BSOSM might be attributed to nutritional quality of BSOSM.

The lowest values of live weight, slaughter weight, empty body weight and dressed weight recorded in those rabbits fed 10 % BSOSM might be as a result of lower feed intake which could be attributed to high level of anti-nutritional factors in the diet as reported by Midala *et al*. (2013) which could not be completely removed by boiling processed.

Table 3: Live and slaughter information of weaner rabbits fed graded levels ofBSOSM

Parameters	T_1	T_2	T_3	T_4	T_5	SEM
Live wt. (g)	1200^{b}	1216^{b}	1450^{a}	1600^{a}	1100^{b}	102.2
SW (g)	1150.0^{bc}	1116.7^{c}	1350.0^{ab}	1450.0^{a}	1050.0^{c}	102.2
EBW	1000.0^{ab}	850.0^{b}	1050.0^{a}	1150.0^{a}	833.3^{b}	86.3
DW (g)	622.98^{cd}	651.99^{c}	758.03^{b}	912.84^{a}	538.61^{d}	40.28
Dressed %	51.95^{b}	53.93^{ab}	52.23^{b}	57.12^{a}	50.36^{b}	2.02

^{a,b,c,d} : means in the same row with different superscripts are significantly ($p< 0.05$) different, Live wt: live weight, EBW : Empty body weight, SW : Slaughter weight, DW : Dressed weight

Conclusion and Recommendation

The finding of this study revealed that *Senna occidentalis* seed is of good nutritional quality if the anti-nutritional factors are removed because, the highest body weight gain and dressing percentage were recorded in those rabbits fed 7.5 % inclusion level of BSOSM which indicated that this level of inclusion could be tolerated by the rabbits. It could then be recommended that up to 7.5 % boiled *Senna occidentalis* seed meal can be included in the diets of weaner rabbits and further researches should be carried out to explore other processing methods on *Senna occidentalis* seed with aim of making it more valuable in the livestock industry.

References

Abdullah, M., Mohammed, G. and Abdulkadir, N.U. (2003). *Medicinal and economic plant of Nupe.* Pub.Jube Evans Books and Publications, Bida, Niger State.

Aduku, A.O. (2004). *Animal nutrition in the tropics.* Davcon Computers and Business Bureau, Samaru, Zaria, Nigeria.

Ahamefule, F.O., Ejiofor, C.A. and Ibeawuchi, J.A. (2000). .A comparative study of the constituents of cattle, sheep and goat milk in a hot humid environment.*Disc and Innovation,* 15(1/2): 64-68.

Ari, M.M. (2006). Evaluation of the effect of various processing methods on the utilization of Soybeans (*Glycine max*) by broilers. Ph.D. Thesis,Federal University of Technology, Minna, Nigeria.

Augustine, C.J., Igwebuike, U., Salome, S., Midau, A.A., Jaafa-furo, M.R., Mojaba, D.I. and Dazala,I.U. (2010). Evaluation of economic performance of broilers chicken fed graded levels of processed *Cassia obtusifolia* seed meal. *International Journal of Sustainable Agriculture*, 2(3): 47-50.

Ayanwale, B.A. (2006). Growth and carcass characteristics of broilers fed alkalis processed soybeans. *Nigerian Journal of Animal production*, 33(1): 40-44.

Duncan, D.B. (1955). Multiple Range and Multiple F-test. Biometrics 11: 1-42.

FMSN (2009).Federal meteorological station Minna. International Airport Weather Report. (Un-published).

Midala, D.B., Augustine, C., Moses, J.D. and Jimruna, E.Y. (2013). Response of growing rabbits to graded levels of raw *Senna occidentalis* seed meal. *International Journal of IT, Engineering and Applied Sciences Research*, 2(8): 2319 - 4413.

Omoikhoje, O., Aruna, M.B. and Bamgbose, A.S. (2009). Effect of cooking time on some nutrient and anti-nutrient component of Bambara groundnut seeds. *Journal of Animal Science*, 80: 52-56.

SAS (2008). SAS user's guide, version 9.2. Statistical Analysis System, Institute.Carry.NC, USA.

Tasaka, A.C., Weg, R., Calore, E.E., Shinhorini, I.I., Dagli, M.I.Z., Haraguchi, M. & Gorniak, S.I. (2000). Toxicity testing of *Senna occidentalis* seed in rabbits. *Journal of Veterinary Research Communication,* 24(8): 573-582.

Yahaya, S.K. (2014). Performance and blood biochemical profile of wild indigenous Guineafowls fed differently processed Negro coffee (*Senna occidentalis*) seed meal under intensive system management. Ph.D. Thesis submitted to the Postgraduate School, Federal University of Technology, Minna.