GROWTH PERFORMANCE OF GROWER RABBIT FED GRADED LEVELS OF SOYA BEAN CAKE RESIDUE

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ABSTRACT

This study was conducted at late Prof. Lawal Abdu Saulawa Livestock Teaching and Research Farm, Department of Animal Science, Faculty of Agriculture FUDMA, to evaluate performance of grower rabbits fed diets containing soya bean cake residue meal (SBCR) at three levels of inclusion.Eighteen grower rabbits of same breed and mixed sexes was used for the study. The rabbits were randomly assigned to three (3) treatment groups in a completely randomized design (CRD)with treatment replicating three (3) times with two (2) rabbits per replicate. SBCR was used at 0, 67 and 100% levels to replace soya bean meal. The result of the growth performance showed decrease in parameter evaluated as the level of SBCR increases in the diets. Rabbits fed (0%SBCR) recorded significant higher final body weight 1.27g which was similar to rabbits fed 67% and 100% SBCR while those on T3 (100% SBCR) had the least value of 1.20g. It was therefore concludedthat the Soybean cake residue have no significant difference on final weight, total weight, feed intake, and feed conversion ratio. Hence, farmers should lay more emphasis on the use of full fat soybean meal rather than its residue.

KEYWORDS

rabbit soybean cake graded residue

1. INTRODUCTION

Nourishment uncertainty is a major figure in numerous creating nations like Nigeria in the stage of quickly developing populace (Sudik, *et al.,* 2020). The call for creature proteins midgets' supply and this may proceed in the future as numerous challenges impacting against animal's generation endured (Sudik, *et al.,* 2020). One of such challenge is tall taken a toll of bolster past the obtaining control of most agriculturists (Sudik, *et al.,* 2020). The tall fetched of bolster is due to competing request of ordinary feedstuffs between people and animals especially non-ruminant species (pigs, rabbits and poultry). Alabi *et al*. (2018) and Safwat *et al.* (2014) repeated that the utilization of non-conventional and locally accessible fixings diminished taken a toll nourish. Over 50% of Nigerian ranchers are locked in the animals industry (NAERLS, 2015). In spite of the self-evident commitment of the animals industry, it is tormented with a few challenges which have hindered its improvement. Among the challenges are insufficient sustenance, the competitive nature of bolstering fixings with people and destitute nourish quality and supply. Developing populace, urbanization and financial development in creating nations are contributing to developing request for animals and animals' items (Saleh, *et al.,* 2020) and moreover contributed a parcel to the competition for bolstering fixings. All inclusive, human populace is anticipated to increment from around 6.5 billion to at slightest 8.2 billion by 2050 (Rosegrant *et al.,* 2009). More than 1 billion of this increment will happen in Africa (Saleh, *et al.,* 2020). This

requests that elective nourish assets for animals must be recognized and assessed (Dan, 2015). Impressive amounts of edit buildups and agro-industrial by-products reasonable for nourishing animals are being created annually in most creating nations; be that as it may, since of need of technical-know-how they are misplaced or underutilized by ranchers (Saleh, *et al.,* 2020). To meet the expanding request for creature protein, accentuation require to be given to non-conventional sources of bolster that can effortlessly be overseen by rabbits as against the routine sources required by other animals such as cattle, sheep, goat, pig and poultry (Yusuf, *et al.,* 2010). To make rabbits raising more practical as a small-scale trade, Alawa, Karibi-Botoye, Ndukwe and Berepubo (1990) have pushed the advancement of elective bolstering materials that would be generally cheaper when compared with commercial or customary feed.

It was be that as it may detailed by Bassey *et al*. (2008) that rabbits can change over sinewy bolster fixings and agro-industrial by-products to meet way better than other animals' species. Consequently, there is require for superior and economical implies of rabbit nourish all year circular. The look for financially reasonable, naturally inviting and sound nourish stuff that can support all year-round rabbit generation has been the center of creature nutritionist in later times. Numerous businesses have illustrated that there is advantage of utilizing bean cake buildup as a protein source for ruminants in substitution of corn, as they are provided together.

One of such agro-by items considered in this consider is sun dried soya bean cake buildup (SBCR). SBCR is a by-product of drain and cheese delivered from soya bean. It has been detailed to be a great source of protein in nourishing animals (Odeyinka *et al*., 2007). A ponder conducted by Ngele *et al*. (2011) detailed that cultivator rabbits can utilize up to 40% incorporation levels SBCR. In any case, Data on the utilization of SBCR past 40% in rabbit count calories is constrained. The ponder subsequently extraordinary to examine the impact of nourishing changing levels of SBCR on the development execution of producer rabbits (67% and 100%).

One of the issue this think about tends to address is an elective to as of now tall estimated of creature bolsters and competition between people and animals on ordinary bolster, which have expanded the taken a toll of animals generation and in this way bringing down the benefit edges. Animals makers counting those included in rabbit generation in this way the consideration of the soybean cake buildup in the rabbit bolster can lower the taken a toll of inputs, decrease the competition between people and animals on ordinary bolster by laying more accentuation non-conventional nourish sources since it is cheaper, more secure, financially reasonable and promptly accessible. Bhar *et al*. (2000) detailed that, soybean cake buildup might be an elective fixing to wheat offal, maize offal and rice brand depending on their showcase prices.

2. MATERIAL AND METHODS

2.1. Experimental Site

The experiment was conducted at late Prof. Abdu Lawal Saulawa Teaching and Research Farm, Department of Animal Science, Faculty of Agriculture Federal University Dutsin-Ma Katsina State located in the Sudan Savanna ecological zone. The area lies between Latitude 12°27"18"N and Longitude 7°29"29"E, and 605 meters above the sea level. The estimated mean annual rainfall is 820.51mm as well as total annual rainfall 1,257.32mm is between the months of May/June and September/October with the peak in the month of August. The mean annual temperature ranges from 29°C - 31°C (Abaje, *et al.,* 2014).

2.2. Experimental Material

Eighteen (18) grower rabbits of same breed and mixed sexes was used for the study. The rabbits were randomly assigned to three (3) treatment groups in a completely randomized design (CRD). Each treatment was replicated three (3) times with two (2) rabbits per replicate.Fresh soya bean cake residue was sourced from local soya bean cake producers in Dutsin-Ma town, sun dried on a concrete floor until crispy to touch. Other feeds ingredient such as wheat offal, bone meal, salt, and vitamins premix were also purchased from a reputable sellers/company.

Table1: Composition of the experimental diets

Ingredient	T1 (0%)	T2 (67%)	T3 (100%)
Maize	30.00	30.00	30.00
Soya bean meal	15.00	5.01	0.00
SBCR	0.00	9.99	15.00
Wheat offal	15.00	15.00	15.00
Maize offal	21.5	21.5	21.5
Groundnut forage	15.85	15.85	15.85
Bone meal	2.00	2.00	2.00
Salt	0.25	0.25	0.25
Premix	0.25	0.25	0.25
Methionine	0.15	0.15	0.15
Total	**100.00**	**100.00**	**100.00**
Calculated analysis			
ME(kcal/kg)	2881.77	2833.78	2831.56
Crude protein	18.00	17.34	17.17
Crude fiber	8 56	7.64	7.40
Calcium	1.15	1.14	1.14
Phosphorus	0 82	0.78	0.76
Methionine	0 56	0.53	0.54

T1: treatment1, T2: treatment2, T3: treatment3, SBCR: Soya bean cake residue, ME: Metabolizable Energy

2.3. Experimental Design

There were three (3) experimental diets formulated for this study, using Soya bean cake residue to replace soya bean meal at the concentration of 0%, 67%, and 100%.Treatment one which served the control (T1 control), treatment two (T2) and treatment three (T3) respectively. The rabbits were randomly picked and assigned into three treatments in a completely randomized design. The rabbits were fed *ad libitum*and they were acclimatizationfor one week. They were given control diets and prophylactic treatment against ecto and endo parasite using ivermectin at 0.30ml/kg during the adaptation/ acclimatization period. The experiment last for 49days (7 weeks).

2.4. Measurement

At the beginning and weekly intervals during the experiment, the following parameters were measured. All measurement was taken in the morning.

2.5. Body Weight

This was measured by weighting the experimental animals at the beginning of the experiment and at weekly intervals.

2.6. Weight Gain

Weight gain of the rabbits was obtained by subtracting the initial weight from the final weights.

2.7. Feed Intake and Feed Conversion Ratio

This was determined by subtracting the leftover from feed offered the previous day. Feed intake= feed offered -leftover.Feed conversion ratio was determined as the ratio of feed intake to weight gain of the rabbits. Feed conversion ratio= feed intake/weight gain.

2.8. Mortality Record

Record of mortality of each treatment was keep throughout the experiment

2.9. Cost Implication Feed Cost

Feed cost was calculated from the cost of individual ingredients used in the formulation, cost of all ingredients was be estimated from the cost incurred in transportation and processing.

2.10. Statistical Analysis

All data collected were subjected to one-way analysis of variance (ANOVA) using SAS, 1998 and Duncan's Multiple Range Test (DMRT) was used to separate different means.

3. RESULTS AND DISCUSSIONS

Table 2: Feed intake of grower rabbit fed with graded level of soybean cake residue.

Parameters	T1	T2	T3	SEM
Week 1	465.00	422.00	486.25	43.19
Week 2	471.00	426.50	496.00	42.59
Week 3	500.00	508.33	406.50	31.47
Week 4	733.75[a]	744.19[a]	578.50[b]	40.29
Week 5	747.00	747.50	636.00	25.11
Week 6	703.75[a]	614.67[b]	598.00[b]	20.19
Week 7	735.50	633.33	633.00	41.85

[abc] = *means within rows bearing differentsuperscripts differs significantly at p > 0.05*
SEM=standard error of the mean,

Table 2 above shows the feed intake of grower rabbit fed with graded level of soybean cake residue. It was observed in the total feed intake that there was no significance difference (p>0.05) across all the treatments. A total feed intake was higher for the zero level of inclusion of soybean cake residue.

Table 3: Body weight of grower rabbit fed with graded level of soya bean cake residue

Parameters	T1	T2	T3	SEM
Week 1	0.80	0.88	0.81	0.56
Week 2	0.87	0.92	0.88	0.16
Week 3	0.87	0.93	0.93	0.19
Week 4	1.02	1.05	1.02	0.16
Week 5	1.78	1.16	1.06	0.15
Week 6	1.23	1.21	1.15	0.16
Week 7	1.27	1.25	1.20	0.15

[abc] = *means within rows bearing differentsuperscripts differs significantly at p > 0.05,* T1: treatment1, T2: treatment2, T3: treatment3, *SEM=standard error of the mean,*

Table 3 above below is the result showing decrease in parameters evaluated as the level of SBCR increases in the diet. The final body weight ranges from 1.27-1. 20kg. Rabbit fed (0% SBCR) recorded significantly higher final body weight of 1.27 kg, which is similar to rabbit fed 67% (1.25kg) SBCR while T3 (100% SBCR) has the least value 1.20kg. Weight gain decreases linearly with increase in level of SBCR. The increased in total body weight gained observed in T1 could be as a result of an increase in feed intake and better utilization of soya bean milk residue meal. This confirmed earlier reports of Lei *et al.* (2004), Shunong *et al. (*2013). Average daily weight gain was significantly (P>0.05) influenced by the dietary treatments. Nevertheless, the daily weight gain values recorded in the present study was lower than that of Phimmasan*et al.* (2004), they recorded 18.1g in their study.The difference observedon the weight gain in relation to other studies could be as a results of either breeds, diets or duration of study (Lei *et al.,* 2004).

Table 4: Performance of grower rabbit fed with graded level of soya bean cake residue

Parameter	T1(0.0)	T2(67)	T3(100)	SEM
Initial weight (g)	0.65	0.78	0.75	0.13
Final weight (kg)	1.27	1.25	1.20	0.15
Total weight gain (kg)	0.62	0.46	0.45	0.07
Total feed intake (g)	4356.00[a]	4097.00[b]	3834.25[c]	69.06
Weekly Feed intake (g)	622.29[a]	585.29[b]	547.75[c]	9.87
Daily feed intake (g)	88.89[a]	83.612[b]	78.25[c]	1.41
Feed conversion ratio	7.16	9.29	8.52	1.25
Total feed cost (N)	1180.48[a]	1048.83[b]	950.89[c]	17.49
Feed cost/kg gain (N)	1941.3	2377.3	2113.1	322.16

[abc] = *means within rows bearing different super scripts differs significantly at p > 0.05*
SEM=standard error of the mean,

Table 4 shows that there is no significant difference (p>0.05) between final weight gain and total weight gain across all the treatments fed graded level of soybean cake residue. This means that, inclusion of SBCR into the diet of grower rabbitdoes not statistically in any way affect their performances when compared with the treatment 1 (control). Also, the reason why the treatments were statistically the same, including the control even with the inclusion of SBCR at different concentrations (0.0%, 67% & 100%) may be attributed to the lower crude protein (17.20% CP) contained in the diet's compositions as against the recommended rabbit crude protein (27% CP) as reported by Wang and Cavins (1989). This finding is in agreement to the findings of Maidala

et al. (2011) they reported that total weight gain was significantly (p<0.05) affected by the SCBR. In contrast, the final weight values obtained in this study were lower than the values (1087g-1404g) reported by Saleh *et al.* (2020) and Ubwa, James, and Ironkwe and Amaefule (2012).

The FCR was better in the control dietwith 0.0% level of inclusion of SBCR. This is in agreement to the finding of Saleh *et al.* (2020) who reported that feed conversion ratio, rabbits fed diet 1 (0.0% SCR) and diet 2 (25.0% SCR) did not differ significantly in terms of their feed conversion ratio at p>0.05; likewise, those on diet 4 (75.0%SCR).

The results of total feed intake, weekly feed intake and daily feed intake obtained shows that there is significance difference (P<0.05) among all the treatments fed graded level of SBCR. The result of this study is in total agreement to the findings of Iyaghe-Eracpotobor (2006) who reported that total feed intake was significantly higher for the control than the 100% SBCR group. Total feed intake was also lower for the 25% SBCR group while being similar for 75 and 50% SBCR groups. On the contrary, Madala *et al.*(2011) reported that the values of feed intake are within the range reported on rabbits fed differently processed soyabean, it is however lower than 111.9 g reported by Farinu, (1994). Iyaghe-Eracpotobor and Osiever (2010) reported in their work that when rabbits are offered concentrates and forages, they would consume high amountof dry matter in order to meet their body requirement for nutrients. The type and nature of forage seems to play a significant roles in determining the total feed intake by affecting the intake of both the concentrates and forage. The control rabbits consumed significantly (P>0.05) more total feed than the experimental groups. This means that there is an inability for the animals to sufficiently adjust their intake with increase in SBCR level. The feed conversion ratio was better on the control diets. This is in agreement with the findings of Maidala and Doma, (2016), they reported that the feed conversion ratio was better in control diet to 60% level of inclusion (P<0.05).

Considering how much rabbits are sold in most of markets in Nigeria today, rabbits are sold at an average of N1300 to N1800, it would cost between **N**950, **N**1048 to **N**118 to produce rabbit on 67% and 100% SBCR. Soybean cake residue is cheap and readily available in most areas of the country because of the widespread production and consumption of soybean cheese. It's widely used by farmers in northern Nigeria and villages for fattening of sheep and cattle.

4. CONCLUSION

The result in this research demonstrates that the SBCR diet was not as palatable as the control diet hence lower concentrate intake observed. These, couples with an inability of the rabbits to adequately adjust their intake, to augmentfor the inadequate nutrient intake from the concentrate, as a result of the restriction in concentration offered the animals.The above mentioned constraints could be the reason for the lower weight gain of the rabbits, especially those offered the lower levels of concentrate.

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