

MCL 008: Effect of Different Agro Industrial By-Products on the Growth Performance of Growing Rabbits

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Abstract

An experiment was conducted to evaluate the growth response of growing rabbits to diets containing different agro industrial by-products. A total of 24 weaner rabbits were used for this study. Four experimental diets were formulated and designated as T1, T2, T3, and T4. T1 (control diet) contained 20% rice offal (RO) as its main fibre source while T2, T3 and T4 contained 20 % each of Burukutu waste (BKT), Cassava peel meal (CPM) and Maize offal (MO) respectively as their main fibre source. The rabbits were randomly allocated to four experimental treatments of six rabbits per treatment while each treatment was replicated three times with two (2) rabbits per hutch in a completely randomized design. The result of growth performance revealed that average weight gain and feed conversion ratio were significantly ($P < 0.05$) influenced by the dietary treatments. Rabbits fed 20% BKT had superior weight gain compare with those fed other diets. Average feed intake was however not influenced ($P > 0.05$) by the dietary treatments. It was concluded that 20% BKT can be included in the diet of grower rabbits without adverse effect on growth performance of rabbits.

Keywords- growing rabbits, burukutu waste; maize offal; rice offal; growth performance

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Introduction

The rabbit (*Oryctolagus cuniculus*) is a non-ruminant herbivore which utilizes much undigested, unabsorbed feed materials, primarily cellulose, as a source of nutrients for maintenance and production. They are known to have the ability to thrive on non-conventional feedstuffs and forages which cannot be consumed directly by man.

Such forages are cheap, abundant and available all the year round in many parts of Nigeria (1, 2). Although rabbits can survive on all forage diets, optimum performance can only be ensured in a mixed feeding regime involving forage and formulated feeds (3). Feed constitute the dominant input in animal production ranging from 65 - 75 % of the total cost of production. Similarly, feed ingredient account for over 90 % of compound feed industry (4). Therefore, the relationship between feed ingredient and animal production output is both direct and obvious. It has been reported that conventional protein and energy feed ingredients for non-ruminants including rabbits, are very scarce and expensive because of the competition between humans and this group of livestock (4). This trend has necessitated the use of agro industrial byproducts such as cassava peel meal, wheat offal, yam peel meal, maize offal, sweet potato peel meal, rice offal, groundnut shell, palm kernel meal, brewers dried grains etc. in formulating feed for the livestock. Therefore, this study was aimed at evaluating the use of different agro industrial byproducts in the diets of growing rabbits.

Materials and Method

Experimental site

This study was conducted at the Rabbitry Unit of the Teaching and Research Farm, Federal College of Wildlife Management (FCWM), New Bussa, Niger State, Nigeria. The poultry building is an open sided type that permits adequate ventilation in the house, with a concrete floor and zinc-roofing sheet. New Bussa sits at 9°53'N 4°31'E, and the original town of Bussa is located about 40 km North of New Bussa at 10°13'51"N 4°28'31"E (altitude 170 m.a.s.l.). The climate of the area is tropical with monthly average temperature of 34°C and mean annual relative humidity of 60%.

Sources of Experimental Materials

The agro industrial by-products used in this study were burukutu waste, cassava peel meal, rice offal and maize offal which were purchased around Neighbouring market within New- Bussa and its catchment areas.

Experimental Design and Management of Birds

Twenty four (24) weaner rabbits of composite breeds and mixed sexes, aged between 5 and 6 weeks were procured from the local rabbitry farmers in Mokwa, Niger state. The rabbits were raised on hutches at the College farm. The rabbits were housed according to treatments in a well-ventilated room in hutches. The hutches were fitted with drinkers and feeders. The rabbits were pre-conditioned for 3 days, during which they were treated against parasitic infestation with Ivermectin subcutaneously. They were given access to feed and clean water *ad libitum* during the 54 days in which experiment lasted. At the commencement of the study, the rabbits (initial average weight = 805g) were randomly allocated to four experimental treatments of six rabbits per treatment, while each treatment was replicated three times (2 rabbits per replicate) in a completely randomized design (CRD).

Experimental diets

Four experimental diets were formulated and designated as T1, T2, T3, and T4. T1 (control diet) contained 20% rice offal (RO) as its main fibre source while T2, T3 and T4 contained 20 % each of Burukutu waste (BKT), Cassava peel meal (CPM) and Maize offal (MO) respectively as their main fibre source. The proximate composition of the different agro industrial by products and gross composition of the experimental diets are presented on Table 1 and 2 respectively.

Table 1: Proximate Composition of different agro industrial by products

Nutrients, %	Rice offal	Burukutu waste	Cassava Peel Meal	Maize offal
Dry Matter	92.63	93.54	90.56	93.89
Crude protein	17.08	24.07	18.98	17.02
Crude fibre	6.04	8.20	8.05	4.91
Ash	6.21	5.00	6.64	6.81
Ether Extract	6.69	4.50	5.19	6.77
Nitrogen free extract	56.61	51.77	51.7	58.38

Table 2: Gross composition of Experimental diets

Ingredients, Kg	20% RO	20% BDG	20% CPM	20% MO
Maize	50.00	50.00	50.00	50.00
Groundnut cake	15.00	15.00	15.00	15.00
Fish meal	1.00	1.00	1.00	1.00
Soyabean	12.00	12.00	12.00	12.00
Rice offal	20.00	-	-	-
Burukutu waste	-	20.00	-	-
Cassava peel meal	-	-	20.00	-
Maize offal	-	-	-	20.00
Bone meal	1.00	1.00	1.00	1.00
Salt	0.40	0.40	0.40	0.40
*Premix	0.30	0.30	0.30	0.30
Methionine	0.20	0.20	0.20	0.20
Lysine	0.10	0.10	0.10	0.10
Total	100.00	100.00	100.00	100.00
Calculated Nutrients, %				
Crude protein	16.93	17.06	15.98	15.67
Crude fibre	10.39	10.47	10.87	10.65
Ether extract	5.73	5.88	5.76	5.80
M.E (Kcal/kgME)	2502.08	2670.46	2571.65	2580.09

BKT=Burukutu waste, MO=Maize offal, RO=Rice offal, CPM=Cassava peel meal. ME=Metabolizable energy. *Premix in diets provided per kg: Vit. A 10000 IU, Vit. B 2000 IU, Vit. E 13000 IU, Vit. K 1500mg, Vit. B12 10mg, Riboflavin 5000mg, Pyridoxine 1300mg, Thiamine 1300mg, Panthothenic acid 8000mg, Nicotinic acid 28000mg, Folic acid 500mg, Biotin 40mg, Copper 7000mg, Manganese 48000mg, Iron 58000mg, Zinc 58000mg, Selenium 120mg, Iodine 60mg, Cobalt 300mg, Choline 27500mg

Data collection

Performance data

Growth performance study

Rabbits were weighed individually at the beginning of the experiment and weekly thereafter for the duration of the experiment using weighing scale. Weighing was done before the morning feeding. The parameters determined for the evaluation of growth performance were initial weight (g), average feed intake (g), average weight gain (g) and feed conversion ratio. Weight gain for each animal was calculated by subtracting the initial weight (g) from the final weight (g), while the feed conversion ratio was calculated by dividing the average feed intake (g) by the average weight gain (g).

Chemical analysis

Proximate composition of different agro industrial by products and experimental diets were analysed using the methods described by (5).

Statistical analysis

Data collected were subjected to analysis of Variance using SAS software (6) while significant means were separated with Duncan multiple range test at 5% level of significance.

Results

Table 3 shows the result of the growth performance of growing rabbits fed diets containing different agro industrial by-products. There were significant ($P < 0.05$) differences in the daily weight gain and feed conversion ratio of the rabbits. Daily weight gain of rabbits fed 20% BKT was higher ($P < 0.05$) than those fed other diets. The lowest daily weight gain was recorded among rabbits fed 20% MO diets. Rabbits fed 20% BKT had better feed conversion ratio ($P < 0.05$) than those fed other diets. There was no significant ($P > 0.05$) difference in the daily feed intake of rabbits.

Table 3: Growth Performance of growing rabbits fed diets containing different agro industrial by-products

Parameters	20% RO	20% BKT	20% CPM	20% MO	SEM
Initial weight, g	806.62	805.01	805.90	804.98	0.83
Final weight, g	1503.33 ^b	1850.00 ^a	1523.07 ^b	13337.64 ^b	128.09
Total weight gain, g	696.71 ^b	1044.99 ^a	717.17 ^b	532.66 ^b	128.08
Daily weight gain, g	12.90 ^b	19.35 ^a	13.29 ^b	9.86 ^b	2.37
Total feed intake, g	3222.90	3176.06	3357.90	3188.70	90.95
Daily feed intake, g	59.68	58.82	62.18	59.05	1.69
Feed conversion ratio	4.62 ^b	3.04 ^a	4.68 ^b	5.99 ^c	0.74

abc = mean with different superscripts within the same row are significantly ($P < 0.05$) different. SEM=standard error of mean. BKT=Burukutu waste, MO=Maize offal, RO=Rice offal, CPM=Cassava peel meal

Discussion

There have been wide variations in responses of rabbits to the use of Agro industrial byproducts in poultry diets. These were attributed to differences in quality, varieties, storage periods, climatic conditions to mention but a few. However, there are several literature reports on the inclusion levels of these unconventional, agro by-products in rabbit diets without adverse effect on performance in Nigeria (7, 8, 9). In this present study, the average daily weight gain and feed conversion ratio of rabbits fed 20% BKT diet was better than those fed other diets. This observation may be attributed to the higher crude protein content (24.07%) of BKT compared with other test ingredients. This result agrees with the report of (10) reported that sorghum beer residue from the industry can be included at a level of 15 and 20% in the diets of breeding and weanling does respectively without adverse effects on performance. (11) fed diets of 0, 12.5, 25 and 37.5% *burukutu* waste to adult pigs and found that performance characteristics related to feed intake, weight gain and feed to gain ratio were not affected by the level of inclusion of the waste. The decrease observed in body weight gain of rabbits fed 20%R.O, 20%CPM and 20% M.O diets may be attributed to the anti-nutritional factors such as trypsin inhibitors and tannins which might have impaired the absorption of nutrients in the ingesta thereby resulting in depressed weight gain (12). Anti-nutrients are known for interfering with nutrient utilization by forming complexes with the substrate at the site of digestion (13). Also, it can be inferred from these results that the nutrients supplied by these diets were not enough to produce significant increase in weight similar to the rabbits fed BKT based diets. (14) reported that rice offal is known to contain high level of fibre and low protein and energy and high dietary fibre depresses apparent digestibility of dry matter and nitrogen, decreases daily body weight and increase feed to gain ratio (15).

Conclusion

Based on the result of this study, it can be concluded that 20% *burukutu* waste can be included in the diet of growing rabbits without adverse effect on growth performance of rabbits.

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