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PERFORMANCE AND DIGESTION OF WEANER RABBITS FED SORGHUM BREWERS DRIED GRAIN (SBDG) AS REPLACEMENT FOR MAIZE

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ABSTRACT

In an eight-week trial forty mixed-breed weaner rabbits aged 5-6 weeks were equally allotted to four treatments to evaluate their performance and digestion when they were fed with local sorghum brewers dried grains. Four concentrate mash diets were compounded by replacing of maize with sorghum brewers dried grain (SBDG) at 0%, 20%, 30% and 40% levels, respectively. This ingredient contained 89% dry matter, 20.1% crude protein, 19.4% crude fibre, 8.1% ether extract, 9.5% ash and 32.3% nitrogen free extract. The 30%SBDG had higher crude protein content (20.3%) compared to 20% (19.9%), 0% (18.7%) and 40% SBDG (18.1%) diets. The inclusion of SBDG in the diet increased ether extract and ash contents from 0 to 40%SBDG but decreased crude fibre content. There was significant difference ($P<0.05$) in the feed intake of rabbits fed the experimental diets. The highest values were observed in diets 30%SBDG (118 g/day) and 0%SBDG (109 g/day), followed by 20%SBDG (91 g/day) and 40% SBDG (71.1g/day). However, rabbits fed diet 30% and 0%SBDG (14.8 g/day and 14.5 g/day respectively) had significantly higher average daily weight gain compared to 20%SBDG (11.3 g/day) and 40%SBDG (10.8 g/day). As a consequence, rabbits fed diet 40%SBDG had significantly better feed conversion ratio value (6.66) than the other diets (≥ 7.42). The rabbits fed diet 20%SBDG had higher digestibility of crude protein, crude fibre and ether extract compared to other diets. Therefore, it could be concluded that SBDG might adequately replace maize in diets of rabbits because of improving performances and digestion traits.

Key words: Performance, Digestion, Rabbits, Sorghum, Brewer grain

INTRODUCTION

Competition for conventional feedstuffs by man, industry and livestock has contributed immensely to the high cost of these feedstuffs in the local markets. This high cost coupled with inadequate knowledge of possible alternative and cheap ingredients have been the most important factors militating against the increase in commercial animal production in Nigeria and other developing countries (Olorede and Ajayi, 2005). Babatunde (1986) suggested a drastic increase in the production of ingredients commonly used in livestock feeds, such as maize, soybeans, millet and others, in order to meet the needs of both humans and animals. Where this cannot be achieved, he emphasized that attempts should be made to source for alternative feedstuffs for livestock. Therefore, the quest for exploring the use of alternative feed ingredients that are cheaper and locally available in dietary formulations to reduce production cost becomes imperative (Okeke, 2000). A characteristic of such alternative feedstuff should be its non-competitive usage with man, and brewery by-products fall into this category (Dowling *et al.*, 2003). Some non-brewery alternative feedstuffs have been evaluated and found to be good replacements for the expensive conventional feedstuffs which have direct use as human food. These alternative feed sources have been used successfully by several animal nutritionists

in the formulation of feed, which include the use of cassava peel meal in rabbits (Adegbola and Oduozo, 1992). The production of sorghum brewers waste (SBW) is derived from sorghum used solely or in combination with other cereal grains like maize (maize-sorghum) in the production of burukutu (Ayodeji and Fasuyi, 2005). Sorghum brewers waste is relatively cheap and large quantity is produced in local gin production (Awika *et al.*, 2001). It does not require much of additional processing such as grinding before being incorporated into livestock diets. Therefore, this study evaluates the performance characteristics and digestibility of rabbits fed graded levels of local sorghum brewer dried grain (SBDG) as replacement for maize.

MATERIALS AND METHODS

Animals and experimental design

Forty weaners' rabbits of mixed sexes aged 4 - 6 weeks were used for the experiment. The rabbits were raised in hutches fitted with feeders and drinkers at The Oke-Ogun Polytechnic Saki, Teaching and Research Farm. There was two-week adaptation period during which the rabbits were treated against parasitic infestation with ivermectin subcutaneous and multivitamin added to their water. The forty rabbits were randomly allotted into four treatments (10 per treatment) in a completely randomized design. Fresh and wet local sorghum brewers waste was sourced from reputable local brewery in Saki metropolis, oven-dried for three days and stored in polythene bags for subsequent use. Four mash diets were compounded by replacing of maize with SBDG at 0%, 20%, 30% and 40% levels, respectively. The diets were fed to rabbits at 5% of their body weight. The animals were weighed before the commencement of the experiment and subsequently weekly during the experimental period. The feed intake was calculated from the feed offer and feed refusal. During the digestion trial (6th week of experiment), records of quantity of faeces voided per day per rabbits were kept. Samples of faeces voided per treatment were then oven-dried, ground and sub-sampled for chemical analysis.

Chemical Analyses

Samples of SBDG, experimental diets and faeces were taken to laboratory for determination of the proximate composition according to method of AOAC (2000).

Table 1: Gross composition of experimental diets

Ingredients	0%SBDG	20%SBDG	30%SBDG	40%SBDG
Maize	40.0	20.0	10.0	-
Sorghum brewer grain	-	20.0	30.0	40.0
Wheat offal	21.5	21.5	21.5	21.5
Groundnut cake	16.0	16.0	16.0	16.0
Palm kernel cake	10.0	10.0	10.0	10.0
Bone meal	2.00	2.00	2.00	2.00
Lysine	0.25	0.25	0.25	0.25
Methionine	0.25	0.25	0.25	0.25
Salt	0.50	0.50	0.50	0.50
Vitamin Premix	0.50	0.50	0.50	0.50
Proximate Composition of diets	0%SBDG	20%SBDG	30%SBDG	40%SBDG
Dry matter	89.3	87.3	89.1	89.4
Crude protein	20.1	18.7	19.9	20.3
Crude fibre	19.4	9.40	11.1	13.7
Ether extract	8.10	8.90	10.3	10.8
Ash	9.50	7.40	10.1	10.4

¹Premix provided per kg diet: vitamin A, 12,000 IU; vitamin D₃, 1,000 IU; vitamin E acetate, 50 mg; vitamin K₃, 2 mg; biotin, 0.1 mg; Fe, 100 mg; Cu, 20 mg; Mn, 50 mg; Co, 2 mg; I, 1 mg; Zn, 100 mg; Se, 0.1 mg; Robenidine, 66 mg.

Statistical Analysis

Data collected were subjected to one-way analysis of variance procedure of the general linear mode (SAS, 2008). The means were therefore separated using the Duncan's New Multiple Range Test.

RESULTS AND DISCUSSION

There was significant difference ($P < 0.05$) in the feed intake of rabbits fed the experimental diets. The highest values were observed in diets 30%SBDG and 0%SBDG, followed by 20%SBDG and 40% SBDG. However, rabbits fed diet 30% and 0%SBDG had significantly higher average daily weight gain compared to 20%SBDG and 40%SBDG. As a consequence, rabbits fed diet 40%SBDG had the best feed conversion ratio value compared with the other groups. It is important to remark that only 30 and 40% SBDG diets met the fibre requirements, and it might have influenced the results obtained. The daily feed intake in this study was higher than 77.6-87.5 g reported by Attah *et al.* (2011) but similar to concentrate feed intake of 61.1 – 134 g/day reported for rabbits by Okorie (2003). The daily weight gain obtained in this study was higher than 10.9 – 16.7g/day as reported by Adejinmi *et al.* (2013) for rabbits fed fibrous ingredients. The feed conversion ratio (FCR) was higher than 3.61 – 5.00 (Mufwa *et al.*, 2011) and 3.26 – 3.99 reported by Ogunsipe and Agbede (2012) for rabbits fed millet offal-based diet. Although the rabbits on 0%SBDG and 30%SBDG diets had the highest feed intake, the rabbits fed 40%SBDG had the best FCR.

Table 2: Performance characteristics of rabbits fed SBDG

Parameters	0%SBDG	20%SBDG	30%SBDG	40%SBDG	SEM ¹
Number of replicates	10	10	10	10	10
Feed intake (g/day)	109 ^a	90.8 ^b	118 ^a	71.1 ^c	11.9
Initial weight (g)	560	577	534	436	53.9
Final weight (g)	1366	1208	1362	1092	98.9
Weight gain (g)	806 ^a	631 ^c	828 ^a	659 ^c	91.4
Average daily gain (g/day)	14.5 ^b	11.3 ^c	14.8 ^b	10.8 ^a	1.6
Feed Conversion Ratio	8.00 ^a	8.23 ^a	7.42 ^b	6.66 ^c	1.2

¹SEM: standard error of means. Means with different letters on the same row differ significantly (Duncan test).

The apparent nutrient digestibility of rabbits fed the experimental diets is shown in Table 3. The rabbits fed diet 20%SBDG had higher digestibility of dry matter, crude protein, crude fibre and ether extract compared with the other diets. The protein digestibility in this study was higher (53.4 – 63.6%) than that reported by Ayandiran and Odeyinka (2016). The crude fibre digestibility here was lower than 70 – 75%, as it was reported by Federick (2010). The digestibility of nitrogen free extract was also higher than 38.1 – 41.0% (Ayandiran and Odeyinka, 2016) for rabbits fed bread waste and Moringa based diet.

Table 3: Apparent nutrient digestibility coefficients of rabbits fed SBDG

Parameters	0%SBDG	20%SBDG	30%SBDG	40%SBDG	SEM ¹
Dry Matter	79.7 ^b	83.7 ^a	71.6 ^c	59.5 ^d	3.5
Crude Protein	92.9 ^a	93.3 ^a	88.7 ^b	80.1 ^c	2.0
Crude Fibre	68.1 ^b	75.8 ^a	66.8 ^b	54.8 ^c	2.9
Ether Extractive	87.3 ^b	90.9 ^a	84.4 ^b	68.1 ^c	3.3
Ash	62.2	75.6	64.9	69.6	8.9
Nitrogen free extract	89.1 ^b	93.4 ^a	82.6 ^c	88.9 ^b	1.5

¹SEM: standard error of means. Means with different letters on the same row differ significantly (Duncan test).

CONCLUSIONS

It could be concluded that SBDG could replace maize in the diet up to 30% as indicated by improved performances and digestion parameters, although the variation in the level of fibre might have influenced these results.

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