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The Replacement of Maize with graded level of Brewer's Dried Grain (BDG) in the diet of weaner grasscutters

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Abstract

A 40 Day feeding trial was conducted to determine the effect of replacing maize with brewer's dried grain (BDG) in the diet of grass cutter. 20 growing grass cutter (males) with an average initial weight of 599 g were used for the experiment. Four grass cutter were allotted to each treatment in a completely randomized design. The body weight gain, feed efficiency ratio and protein efficiency ratio were recorded weekly. The result of the experiment showed that the control with 0% level of BDG had the highest feed conversion (1.51) and efficiency (0.66) ratios while the least feed conversion (3.95) and efficiency (0.25) ratios were recorded for treatment 5 (100% BDG inclusion). There was not significant difference ($P < 0.05$) in feed intake among the treatments means. However the body weight gain differed significantly ($P < 0.05$). It was concluded that BDG can be used to replace maize in the diet of grass cutters up to 75% level of inclusion without negative effect on the performance of grass cutters.

Key words: Protein efficiency, feed efficiency, grass cutters, Brewer's Dry Grain (BDG).

1. Introduction

The current acute shortage of protein in Nigeria and rapidly increasing demand for livestock products could be alleviated through the production of grass cutters meat because it gives lean meat with high nutritional values.

In Nigeria of nowadays, effort to combat protein deficiency has been to domestication and feeding of cane rats or grass cutters which are the source of meat and animal protein (Fayenuwo *et al*., 1988). Also very little is known about their production and management especially in the area of nutrition.

High costs of conventional feed resources have caused inadequate concentrated feeding and low productivity in Nigeria livestock industry. These persisting problems necessitate the focus on utilization of cheaper non-conventional alternatives. For instance, Job *et al.,* 1979; Fetuga and Oluyemi, 1976; used sweet potato, cassava peel was used by Tewe (1981) while mango seed kernel was used in an experiment by El-Alaily *et al.,* (1976) to feed poultry birds to replace maize as sources of energy in their diet. Though, choice of these non-conventional alternatives vary from locality to locality depending on availability and cost. Olubamiwa *et al.,*(2000) also fed cooa bean shell to laying birds to replace maize as source of energy in their diet.

However, before the use of non-conventional feed stuffs, adequate research must be conducted to assess their tolerable inclusion level and also determine the deleterious effects such non-conventional feed stuffs would have on livestock. To this effect, feed resources of which are by-products of brewery have been studied, developed and are now widely used for formulating practical diets.

Major among those include BDG, wheat offal, MSP, corn bran, etc. BDG is one of the alternatives to maize in livestock feed. It is the extracted residue of cereal grain resulting from the manufacture of beer.

Brewers' dried grain (BDG), which is a by-product of the breweries, has long been fed to the ruminants (Mudrock *et al*., 1998). It is very bulky, especially when wet, low in energy but high in crude protein (21%) and crude fibre up to (20%) as reported by Yaakugh and Tegbe (1990), and Cheriest and Mayer (1992). (BDG) is spend with regards to its starch content, it contain proportionally more of valuable Vitamin, Mineral, Fat and Protein than were contained in the original cereal grain used (Kingshell *et al.,* 1992). Singh (1998) reported that BDG is a rich source of essential fatty acids and vitamins especially B-complex vitamins.

The feeding of varying levels of BDG in animal diets has been evaluated by various researchers (Tegbe, 1989; Yaakugh and Tegbe 1990). Some of the reports revealed that high BDG inclusion levels in diets depressed feed intake and growth rate (Kornegay, 1998). Yaakugh and Tegbe (1990) also reported that the bulky nature of BDG in the diets may affect the digestibility as well as the availability of amino acids and other nutrients. There is need, therefore, to determine the extent to which grass cutter could digest and derive nutrients from BDG based diets. Amoah (1985) reported that brewer's grain has been used to feed dairy animals and that it is both safe and palatable.

The grass cutter *Thronomys swinderianmus* is a wild herbivorous rodent erroneously regarded by some people as a larger version of the rat. It is commonly focused in Africa (Rosevean, 1969; Baptist and Mensah, 1986; Adjanchaun 1993). In their natural habitat they consumer nuts bark and soft parts of grasses and shrubs (Adegbola, 2000). However, these forages are generally poor in protein, but could provide the animal with crude fibre, energy and some minerals (Adegbola, 2001). In addition to the consumption of forages, grass cutters can resort to other nutritional elements (like agricultural or industrial by products) such as BDG to complete its meal course in order to grow and be healthy.

In close confinement, it is obligatory for the grass cutters farmer to provide supplement feed with the necessary values in quality and good health and reproduction (Ayodele and Meduna, 2007; Banjo, 2009).

This study therefore consider the inclusion of brewer's dry grain (BDG) in grass cutter diet for improving the nutritional value of feed for grass cutters and also to determine the digestibility and nutrient utilization of grass cutters fed graded levels of brewers dried grain based diets.

2. Materials and methods

2.1. Experimental Animals

Twenty male grass cutters (weaners) of about 5 to 6 weeks old with an average weight of 599 g were used for the experiment. The hutches were cleaned and disinfected before the arrival of the animals. The animals were also certified free from helminthes and diseases before they are caged.

The grass cutters were allotted to 5 treatments of 4 animals per treatment. Feed and water were served adlibitum daily.

2.2. Experimental Diets

The 20 grass cutters were allotted into 5 treatments with 4 animals per treatment in a Complete Randomized Design (CRD). The animals in treatment T1 were given diet containing 0% BDG this served as control while T2, T3, T4 and T5 contained 25%, 50%, 75% and 100% BDG respectively. The BDG was used to replace maize in the diet.

2.3. Data collection

The record of weekly body weight, feed intake, feed efficiency ratio and protein efficiency ratio were taken, while the protein contents of diets were determined by Micro-Kjeldahl method

2.4. Statistical analysis

The feeding was based on randomized block design and data collected were subjected to one way analysis of variance by method of Snejechor and Cochran (1967) while significant values were separated using Duncan multiple range test.

2.5. Proximate analysis

The chemical proximate composition of the experimental diets was determined by AOC method.

3. Results and discussion

According to Table 4 all the experimental diets fall within the nutrient requirement of growing grass cutters. The crude protein within (16.70 - 17.78%), Crude fibre (7.03 - 7.65%), EE (6.83 -7.62%), Ash (9.10 - 9.96%), NFE (49.12 - 52.6%) and Gross Energy (kcal/kg) (3203.03 - 3252.30kcal/kg)

Table 5 presents the performance of grass cutters (the daily, weekly and total feed intake of grass cutters. It was observed that there was no significant difference in the average feed intake among the treatments. Treatment 4 (75 % BDG level of inclusion) has the lowest daily feed intake (14.00).

The animals placed on treatment 5 (100 % BDG level of inclusion) had the lowest body weight gain (33.04). The result of feed intake showed that all rations are acceptable by the grass cutters and no undesirable effect was recorded

concerning the health of the animals. There was no significant differences ($p>0.05$) shown on the feed intake of all the treatments. The feed intake increased as the level of inclusion of BDG increases, except treatment five, where the feed intake reduced. The reduce feed intake at the highest level of inclusion (100 %) is in agreement with the work of Yaakugh and Tegbe, 1990; and Kornegay, 1993; that BDG levels in animal diets depressed feed intake and growth rate

4. Conclusion

The result of this experiment showed that BDG can be included in diets of grass cutter up to 75% without the deleterious effect on the health of grass cutters, but the best level of inclusion is 25% for the best performance. It is therefore recommended that for optimum performance Brewers Dried Grain could be included at 25%, considering the growth response, feed efficiency ratio and feed conversion ratio obtained from the experiment.

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Table 1: Ingredient composition of experimental diets

Ingredients	T1	T2	T3	T4	T5
Maize	30	22.5	15	7.5	__
Corn bran	29	29	29	29	**29**
Soya bean	20	20	20	20	**20**
Cocoa dust	17.25	17.25	17.25	17.25	**17.25**
Lysine	0.1	0.1	0.1	0.1	**0.1**
Methionine	0.1	0.1	0.1	0.1	**0.1**
Bone meal	3.0	3.0	3.0	3.0	**3.0**
Salt	0.3	0.3	0.3	0.3	**0.3**
Prexim	0.25	0.25	0.25	0.25	**0.25**
BDG	-	7.5	15	22.5	**30**
Total	100	100	100	100	**100**

Table 2: Calculated nutrients of experimental diets

	T1	T2	T3	T4	T5
Crude protein	88.93	89.00	89.07	89.13	89.20
Crude fibre	17.70	17.95	18.21	18.47	18.72
Dry matter	8.83	9.95	10.28	11.00	11.77
M E C kcal/kg	2636.75	2560.18	2483.60	2407.03	2330.45

Table 3: Proximate analysis of B D G (g\100g DM)

Parameters	%
Dry matter (DM)	92.50
Crude protein (CP)	21.60
Ether Extract (EE)	3.45
Crude fibre (C F)	19.70
Ash	3.62
Nitrogen Free Extract (N F E)	44.3
Cross Energy (kcal\Kg	2314

Table 4: Proximate analysis of experimental diets (g\100g DM)

Parameter %	T1	T2	T3	T4	T5
Dry Matter (Dm)	90.63	90.70	91.63	90.98	91.30
Crude Protein (Cp)	17.00	17.50	17.70	16.90	16.70
Crude Fibre (Cf)	7.03	7.30	7.50	7.62	7.65
Ether Extract (EE)	6.83	6.94	7.48	7.60	7.62
Ash	9.10	9.35	9.52	9.88	9.96
Nitrogen Free Extract	52.6	49.85	49.90	49.24	49.12
Gross Energy(kcal/kg)	3203.03	3204.20	3235.6	3222.5	3252.30

Table 5: Performance of Grass cutters fed BDG

Parameters % Grass cutter	T1	T2	T3	T4	T5	SEM
Average weekly feed intake	131.17	132.89	133.28	133.02^{a}	130.60	4.47
Average Daily feed intake	18.74	18.99	19.04	14.00	18.67	5.40
Total feed intake	918.22	930.23	932.94	931.16	914.20	6.67
Initial body weight	662.50	675.00^{a}	668.75^{ab}	656.25^{ab}	675.00^{c}	1.01
Final body weight	1175.00	1268.75^{a}	1087.50^{ab}	1087.50^{ab}	906.25^{c}	2.51
Average weekly weight gain	56.97	81.25^{a}	59.82^{ab}	61.43^{ab}	33.04^{c}	2.499
Feed conversion ratio	1.51	1.57^{b}	2.23^{b}	2.16^{b}	3.95^{a}	0.18
Feed efficient ratio	0.66	0.64^{a}	0.45^{b}	0.46^{b}	0.25^{c}	0.02

Means having the same letter(s) in a column are not significantly ($p<0.05$) different

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