

PREFERENCE STUDY AND SHORT-TERM INTAKE OF BUNAJI YEARLING BULLS FED BREWERS' DRIED GRAIN FROM DIFFERENT SOURCES

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Abstract

A study was conducted to evaluate the preference and short-term intake of Bunaji yearling bulls fed brewers' dried grain from three sources. The Brewers' dried grain for the trial was procured from three Breweries namely Nigerian Brewery in Kaduna State, Benue Brewery Limited in Benue State, and Nigerian Brewery, Ibadan, Oyo State. Six (6) Bunaji yearling bulls with an average weight of 150 kg were used, and the trial lasted for seven (7) days. The animals were fed 6 kg of brewer's dried grain from each source for two (2) hours daily in a cafeteria system. It was observed that the animals preferred the BDG from Benue and Kaduna equally with a preference index of 0.99 while the BDG sourced from Ibadan was least preferred with a preference index of 0.65. There was significant difference ($P < 0.05$) in the average daily intake. An average daily intake of 5.99 kg DM/2hrs was recorded for the BDG sourced from Benue and Kaduna compared to 3.92 kg DM/2hrs for the BDG sourced from Ibadan.

Keywords: Brewer's dried grain (BDG), preference, short-term intake and Bunaji.

Introduction

Animal nutrition has generally been recognized as being dependent upon 4 basic factors: nutrient requirements of the animal, nutrient content of the feedstuff, digestibility of the feedstuff, and feed intake. (Allison, 1985). The most critical factor in meeting nutrient requirements of a ruminant is knowledge of how much it will voluntarily consume. Conceptually, if an animal could eat enough, it could satisfy its nutrient requirements. But total intake is limited by physical factors of the animal and plant, animal physiological factors, and management strategies of the plant-animal interface. The productivity of a given animal fed a given diet is largely dependent upon the quantity of food consumed and the efficiencies of digestion and metabolism (Grover, 1987). The aim of this paper is to report preliminary data on the nutrient quality and feeding value of different sources of brewers' dried grain arising from a preference and short-term intake study conducted with Bunaji yearling bulls.

Materials and Methods

The Study was conducted at the feedlot of Beef Research Programme, National Animal Production Research Institute (NAPRI) Shika, Zaria. Shika is geographically located between latitude 11° 12'N and 7° 33' E, at an altitude of 640m above sea level (Garmin Receiver, 2015).

Source of Brewers' dried grain and Animals

The Brewers' dried grain for the trial was procured from three Breweries namely Nigerian Brewery in Kaduna State, Benue Brewery Limited in

Benue State, and Nigerian Brewery, Ibadan, Oyo State. The Brewers' dried grains from the three sources were taken to the laboratory for chemical analysis. Six (6) Bunaji yearling Bulls with an average weight of 150kg were used for this experiment.

Chemical Analysis of Brewers' dried grain

The proximate analysis of the samples of brewers' dried grain was analyzed according to standard methods of AOAC (2000). The acid detergent fibre (ADF) and Neutral Detergent Fibre (NDF) was also analyzed according to the Procedure of Van Soest (1991). The Gross energy was determined by combustion of 0.5gm in an adiabatic Bomb Calorimeter. Metabolizable energy (ME) was determined by using the equation of Alderman and Cottrill, (1985). $ME (MJ/Kg DM) = 11.78 + 0.0064 CP + (0.000665EE)^2 - CF (0.00414EE) - 0.0118A$. Where ME = Metabolizable energy, DM = Dry matter, CP = Crude protein, EE = Ether extract, CF = Crude fibre and A = Ash.

Preference trial

Three metal feeding troughs were used. Six (6) kg of brewer's dried grain from each source was placed into each of the three feeding troughs placed side by side in a cafeteria system. The animals were then allowed free access to the feeds at the same time for two hours each day. The position of the different feeds in the feeding troughs were predetermined and changed daily. The trial lasted for 7 days. The behavior and selectivity of the animals to each of the feed was observed and relative preference index (PI) was calculated using Van Dyne and Headly, (1995)

formulas as

$$PI = \frac{\text{amount of feed intake}}{\text{amount of feed offered}}$$

Based on the dietary preference index calculated, the BDGs' was classified into the following five preference class as follows:

High preference (hp) 0.77 - 1.00, Moderate preference (mp) 0.56 - 0.76, Fair preference (fp) 0.45 - 0.55, Poor preference (pp) 0.26 - 0.44 and No preference (np) <0.26.

Short term intake

The brewers' dried grains from different sources were fed at 6kg DM/2hrs for a total of 7 days. The left-over for each of the brewers' dried grain was recorded daily and intake calculated.

Data Analysis

The data from this trial were analyzed using General Linear Model procedure of SAS (2002) and significant differences among treatment means were compared using Duncan multiple range test of the SAS (2002) package.

Results and Discussion

The chemical composition of brewers' dried grain from the three breweries is shown in Table 1. The dry matter obtained ranged from 82.39 - 83.06%, this values were lower than the values obtained by Anigbowu (2002) this could probably be due to variation in source or drying method of the brewers' dried grain. The crude protein values ranged from 22.50-23.00% which is slightly higher than CP content of 21.60% obtained by Banjo *et al.* (2012). The CP from this study was also higher than the 10.88% CP content reported to be adequate for ruminant production (NRC, 1976). The Crude fibre ranged from 6.61 - 6.82%. Ash ranged from 5.0 - 5.74 %. This result compared favorably with that of Ironkwe and Bangbose (2012)

In this study, the brewer's dried grain from Benue brewery and Nigerian breweries in Kaduna were most preferred. The least preferred was the BDG sourced from Nigerian breweries in Ibadan. The high preference for BDG sourced from Benue and Kaduna could be as a result of proper drying therefore lacking any smell that could repel the animals. Also, the Physical characteristics of the diet such as dry matter content and particle size could have affected the preference as stated by Jarrige *et al.* (1995). This could be as a result of the different processing method undergone by each brewery which might have affected the physical and chemical composition of the BDG. Also, the method of drying might have contributed. The animals only smell the BDG from Ibadan for about 4 seconds everyday when

they are offered and then move to that of Kaduna and Benue. When they consume the whole of the BDG sourced from Kaduna and Benue, then, they return to take some quantity from that of Ibadan. The low preference for the BDG sourced from Ibadan could be as a result of the bad odour which might have resulted from improper drying of the BDG. The average daily intake of 5.99 kg DM/2hrs was recorded for the BDGs' sourced from Benue and Kaduna compared to 3.92 kg DM/2hrs for the BDG sourced from Ibadan. The preference might have been what brought about this significant difference ($P < 0.05$) in the average daily intake because for a feed to be consumed, a feed has first to be recognized as edible and this is because the role of certain senses (i.e. sight, smell, touch and taste) in the feeding behaviour of ruminants affects intake (Baumont, 1996).

Conclusion

From the chemical analysis, the Brewers' dried grains from the three sources have similar chemical composition. However for the preference and short term intake trial, the Brewers' dried grain from Benue and Kaduna was preferred best by Bunaji yearling bulls with a preference index of 0.99 compared to the brewers' dried grain from Ibadan with a preference index of 0.65 and thus might lead to good performance since animals must voluntarily consume a feed first before it can meet up with its nutrient requirement.

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Table 1: Chemical composition of brewers' dried grain from three breweries

Parameters (%)	Source		
	Kaduna	Benue	Ibadan
Dry matter	82.63	82.39	83.06
Crude protein	22.50	23.00	22.94
Crude fibre	6.82	6.61	6.67
Ether extract	2.27	3.92	2.22
Ash	5.74	5.00	5.45
Nitrogen free extract	45.30	43.86	45.78
Acid detergent fibre	22.88	21.86	23.56
Neutral detergent fibre	40.29	42.36	42.28
Acid detergent lignin	10.44	11.72	10.61
Metabolizable energy(MJ/KgDM)	11.80	11.76	11.80

Table 2: Preference index (PI) of brewers' dried grain from three breweries

Source	Preference Index
Kaduna	0.99(hp)
Benue	0.99 (hp)
Ibadan	0.65 (mp)

Table 3: Short term intake of brewers' dried grain from three breweries

Day	Intake Kg/DM/2 hrs			SEM
	Kaduna	Benue	Ibadan	
One (1)	5.93	5.95	3.66	
Two (2)	5.99	6.00	3.92	
Three (3)	6.00	6.00	3.94	
Four (4)	6.00	6.00	3.86	
Five (5)	6.00	6.00	4.00	
Six (6)	6.00	6.00	3.95	
Seven (7)	6.00	6.00	4.10	
Average daily intake	5.99 ^a	5.99 ^a	3.92 ^b	0.05

^{a,b} means with different superscripts differ significantly (P<0.05). SEM = Standard error of mean