NUTRITIVE VALUE OF MALTED SORGHUM SPROUT IN BROILER CHICKEN DIETS

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Abstract
A 56-day trial was carried out to determine the nutritive value of Malted Sorghum Sprouts (MSSP) for starter and finisher phases in broiler chicken. There were 5 dietary treatments, replicated 3 times with 18 birds per pen in a completely randomized design. Five nonisocaloric-isonitrogenous experimental diets were formulated to contain MSP at 0%, 5%, 10%, 15% and 20% to compliment other energy components in the diets. Feed intake was significantly ($p<0.05$) the lowest for birds fed diet 5 while those on diet 2 had the highest values. Body weight gain significantly ($p<0.05$) decreased as the percent MSSP increased in diets. Feed conversion and cost/kg gain significantly ($p<0.05$) favored birds on diet 2 compared to those on diet 1,3,4 and 5 respectively.

Key words : Broiler Chicken, Malted sorghum sprouts, Energy.

Introduction

The poultry industry has suffered more than any other livestock industry as a result of inadequate supply and high cost of feed (Leplaideur, 2004). Pressure on maize, wheat and recently cassava has been on the increase worldwide with emphasis being placed on export and other diversified uses mostly in flour based foods and ethanol production as an alternative source of fuel (Doki, 2007). *Sorghum bicolor* (L) Moench is widely grown in the semi-arid and arid savannah regions of Nigeria. Maunder (2002) reported that sorghum is a traditional crop in Africa and Asia and an introduced or hybridized crop in the western hemisphere. Sorghum is the world's fifth most important cereal and is grown in semi-arid regions of Africa being well adapted to the harsh climate and naturally resistant to many pests (Belton *et al.*, 2003). Malting of sorghum, like barley, involves steeping or soaking, germination, drying and curing in Kiln and polishing. The resultant malt extract is a useful input in breweries and food processing companies where it is utilized for the manufacture of malt drinks, syrups, beverages, baby foods, microbiological media and other useful products. Malted sorghum sprout (MSSP) is a by-product of sorghum malting. Malted sorghum sprout has a lot of prospect as a feed stuff of the livestock industry. It is rich in organic nitrogen (Ikediobi, 1989).

Materials and Methods

Experimental site

The experiment was carried out at the Teaching and Research Farm, Department of Animal Science, Ahmadu Bello University, Samaru Zaria. Located within the northern Guinea Savannah zone on latitude 11° and 12'N, longitude 7° 33' and altitude of 640m above sea level.

Experimental birds

A total of 5-week old 240 birds from a commercial hatchery were used for this experiment. They were grouped into five on the basis of equal weight and were randomly assigned to 5 dietary treatments. There were 57 birds per dietary treatment with three replicates consisting of 16 birds per replicate, raised on deep litter. Feed and water were provided *ad libitum*. The experiment was conducted during the cool season between October and January. The maximum temperatures varied between 14°C - 24°C.

Experimental diets

Five isocaloric and isonitrogenous broiler finisher diets 1,2,3,4 and 5 were formulated, such that they contained 0,5,10,15 and 20% Malted sorghum sprouts respectively and met the requirements for energy, protein, calcium, phosphorus and lysine. Diet 1 was formulated to serve as the control without Malted sorghum sprouts included. Malted sorghum sprout was sourced from Nigerian brewery company Kaduna. Proximate compositions of starter and finisher diets are shown in tables 1 and 2 below.

Parameters measured

At the beginning of the experiment, the birds were randomly allotted to the five dietary treatments on the basis of equal weights and subsequently weighed weekly. Weights obtained were subtracted from the initial weighs to get the weekly weight gain. The cumulative weight gain and feed consumption were computed and used to calculate the feed efficiency and feed cost per kilogram weight gain. Mortality records were documented also.

Statistical analysis

Data obtained in the course of experimentation were subjected to the analysis of variance using the General Linear Model procedure. Significant differences were among treatment means were separated using Duncan's Multiple Range Test. General linear model

Result and Discussion

The performance of broilers fed varying levels of Malted Sorghum sprouts is shown in Table 1. The result showed that birds fed 5% level of MSSP had significantly ($p<0.05$) higher final weight in comparison to those fed 10%, 15% and 20% levels of MSP, but did not differ from the control at the starter phase. This trend was also observed in the values for feed conversion ratio as there was no significant difference ($p<0.05$) between the control and 5% level of MSSP inclusion but significantly differed from others, also reflecting in daily weight gain of birds. For the finisher phase there was significant ($p<0.05$) difference across all levels of inclusion of MSSP as increase in MSSP resulted in a corresponding decrease in weight gain. These values disagrees with earlier reports by Akinola *et al.*, (2002). They reported no significant decrease in weight gain, feed intake and feed conversion ratio as levels of MSSP increased in broiler diets. Fafiolu *et al.*,(2006) on the other hand reported an increase in weight gain as levels of MSSP were increased in layer hen diets, but results showed that egg produced varied significantly ($p<0.05$) across the dietary treatments with a reduction in production as MSSP increased.

Conclusion

It was concluded that MSSP can be included in broiler diets at finisher phase but not beyond 5% level of inclusion in order not to affect performance of birds and there are cost benefits as to justify the inclusion of MSSP in broiler diet as regards cost of feed.

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Table :1: Proximate composition of diets containing varying levels of malted sorghum sprout used at the starter phase in Experiment 1

	EXPERIMENTAL DIETS				
PARAMETERS	0%MSP	5%MSP	10%MSP	15%MSP	20%MSP
Dry matter (%)	91.60	91.95	92.23	91.68	93.01
Crude Protein (%)	23.67	23.31	23.83	23.34	23.37
Crude Fibre (%)	7.37	7.50	8.00	7.63	7.01
Ether Extract (%)	5.88	6.25	6.12	5.76	5.66
Total Ash (%)	5.30	5.55	5.60	6.36	5.98
Nitrogen Free Extract(%)	57.78	56.39	56.46	56.91	57.98

Table :2: Proximate composition of diets containing varying levels of malted sorghum sprout used at the finisher phase in Experiment 2

	EXPERIMENTAL DIETS				
PARAMETERS	0%MSP	5%MSP	10%MSP	15%MSP	20%MSP
Dry matter (%)	93.11	92.65	91.23	92.70	92.01
Crude Protein (%)	21.36	21.41	21.33	21.39	21.27
Crude Fibre (%)	4.13	4.89.	5.10	4.77	5.34
Ether Extract (%)	4.89.	4.25	4.12	3.99	4.00
Total Ash (%)	5.38	5.16	5.75	6.14	6.08
Nitrogen Free Extract(%)	58.25	57.65	56.79	57.91	56.98

Table :3: Effect of graded level of MSP on the performance of Broiler chickens

Parameters	T1	T2	T3	T4	T5	
			%MSSP			
	0	5	10	15	20	SEM
Starter Phase						
Initial wgt (g/bird)	100	100	100	100	100	0.00
Final wgt (g/bird)	1102^{a}	1130^{a}	1016^{b}	819^{c}	616^{d}	36.21
Wgt gain (g/bird/day)	35.78^{a}	36.77^{a}	32.71^{b}	25.69^{c}	18.44^{d}	1.29
Feed intake (g/bird/day)	61.08^{a}	62.81^{a}	59.59^{a}	52.94^{b}	49.62^{b}	1.93
Feed/gain ratio	1.71^{a}	1.71^{a}	1.82^{b}	2.06^{b}	2.76^{c}	0.142
———	140.69^{c}	135.79^{a}	139.28^{b}	151.99^{d}	195.35^{e}	0.00
Mortality	0.33^{a}	0.00^{b}	0.00^{b}	0.00^{b}	0.00^{b}	0.00
Finisher Phase						
Initial wgt (g/bird)	1265	1267	1265	1266	1264	0.00
Final wgt (g/bird)	2331^{a}	2179^{b}	1990^{c}	1986^{d}	1888^{e}	1.48
Wgt gain (g/bird/day)	38.09^{a}	32.58^{b}	25.89^{c}	25.72^{c}	22.30^{c}	2.50
Feed intake (g/bird/day)	140.81^{a}	140.69^{a}	124.39^{b}	109.13^{c}	105.75^{d}	1.54
Feed/gain ratio	3.74^{a}	4.38^{b}	4.86^{c}	4.28^{b}	4.95^{c}	0.45
Feed cost/kg gain (₦)	286.79^{a}	323.36^{a}	344.98^{a}	291.30^{b}	322.70^{b}	30.58
Mortality	0.00	0.00	0.00	0.00	0.00	0.00

MSSP = Malted sorghum sprouts

a, b, c = Means in the same row having different superscript are significantly different ($P<0.05$)

SEM = Standard error of means