INFLUENCE OF GRADED LEVELS OF TOASTED BAMBARA GROUNDNUT MEAL ON RABBIT CARCASS CHARACTERISTICS

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ABSTRACT

The effect of feeding graded levels of toasted bambara ground nut meal on rabbit weaners was investigated. A total of fifty white rabbit weaners of 6 - 8 weeks with an average weight of 366.7 g were fed the graded level of toasted bambara nut meal at 0, 5, 15, 25 or 35% inclusion level in a complete randomized design experiment for a period of six weeks.

The final live weight, daily feed intake were not influenced ($P > 0.05$) by the level of bambara nut meal in the diet. However, positive influence of the graded level of bambara nut meal was observed on the rabbit daily weight gain, feed efficiency dressed carcass, dressing percentage and meat: bone ratio. Rabbits on the 25 and 15% bambara nut inclusion levels were found to have similar ($P > 0.05$) daily weight gain and dressing percentage with the control ration. Rabbit on the 5% bambara nut level diet had the least feed efficiency (0.22) and meat: bone ratio (3.6), while the dressed weights of rabbit fed the diet containing 25% bambara nut meal had the highest dressed carcass weight (501.6g). Rabbits carcass cut-up parts as well as internal organs (liver, heart, kidneys and lungs) were not influenced by the dietary levels of bambara nut meal. But the pelt weight, empty gut weight, lipid and moisture contents were significantly ($P < 0.05$) influenced by the levels of bambara nut meal in the diet.

Keywords: Bambara groundnut, toasting, rabbit carcass.

INTRODUCTION

The high cost and scarcity of feed have been the most important factor militating against increased commercial livestock production in Nigeria. As

search for alternative source of plant protein continues, there is the need to explore the potentials of leguminous plants that are native to Africa such as bambara ground nut *voandzeia subterranea* (L) Thouars. Bambara ground nut is believed to be native to North East Nigeria and Northern Cameroun (Dalziel, 1937). The habit of eating this seed in these areas had been relegated to the background with the advent of groundnut, cowpea and soybean which are higher in crude protein and equally high yielding. However, bambara nut could play a dual role as protein and energy source. Thus it is regarded as nature's complete food for man (Bois, 1927). It has an underground fruiting habit with extremely hard seeds which has favoured its cultivation in areas with adverse conditions.

The history, description and cultivation of bambara have been extensively described (Johnson, 1966; Doku and Karikari, 1971). Extensive work has equally been done on its composition, nutritional and biochemical properties (Doku, *et al*, 1978, Balogun, 1984; Nwokolo, 1987 and Apata and Ologhobo, 1994). These workers have shown that bambara nut ranged in crude protein between 17.3 and 22.9%, ether extract 5.7 to 7.0%, Ash 3.4 - 5.2%; nitrogen free extract 60.4 - 66.0% depending on the variety. Bambara ground nut seeds are virtually free from metabolic inhibitors and toxin a common phenomenon in most legume seeds. With a seed of this potential, its use as a rabbit feed is highly imperative. This study was therefore designed to investigate the best dietary level of toasted bambara nut meal in rabbit diets.

MATERIALS AND METHODS

Fifty white rabbit weaners with age range of 6 - 8 weeks and average weight of 366.78gm were obtained at the Directorate of Food, Road and Rural Infrastructure, Ilorin. The rabbits were randomly allotted to five nutritional treatments in a complete randomized design experiment. The rabbit were housed individually, fed for two

weeks on a commercial poultry growers ration before the commencement of the experiment.

The bambara ground nut seeds used in this study were multiplied at the University of Ilorin Teaching and Research Farm. The seeds were toasted in an open pan containing fine sand at the ratio of 5kg sand to 3kg seed at a temperature of 130°C for 10 minutes.

A control ration containing 40.88% maize, 25% maize milling waste, 15% dried brewers grain 16.12% soyabean cake, 2.0% bone meal, 0.50% salt and 0.5% vitamin premix with no toasted bambara nut meal. Four experimental rations containing 5, 15, 25 or 35% toasted bambara nut meal were formulated where each 5% toasted bambara nut meal replaced 3.4% maize and 1.6% soybean cake. Each ration was fed to ten rabbits for a period of six weeks. During the period, the rabbits were subjected to standard rabbit management procedures.

At the end of the experimental period six rabbits from each dietary group were removed, fasted overnight, weighed and slaughtered through the conventional method. Each was dressed by removing the head at the level of the atlas vertebra, the feet at the carpal joint and between the tibia and calcaneous joint for the fore and hind feet respectively.

The tail was cut very close to the base, before removing the pelt. Only the weights of the head and pelts were reported in the study. Evisceration of the rabbits then followed and all the internal organs were weighed separately and expressed as percentage of dressed carcass weight. The dressing percentage as well as carcass length were determined. The rabbits were then divided into primal parts: leg, shoulder, loin and ribs. Each part was expressed as a proportion of the dressed carcass. The leg being the choicest part was separated into muscle and bone, the muscle:bone ratio was calculated. The moisture and lipid contents were also determined. All data were analysed, using the completely Randomized Design procedure (Steel and Torrie, 1980) while significant differences between treatment means were determined using Duncan (1955) multiple range test.

RESULTS AND DISCUSSION

Data on performance characteristics of rabbits fed graded levels of toasted bambara nut meal are shown in Table 1. The average daily feed intake per rabbit was not significantly different ($P>0.05$) for the treatments except that rabbits on the 35% inclusion level of bambara nut meal consumed slightly less than those on other treatment. This might be due to high energy density of the diet since bambara nut is an energy giving seed (Stanton, 1968). Several workers have reported that high energy diet will lead to reduced feed intake because the energy need of the animal will be satisfied with less feed intake (Richard, et al, 1982; Beynen, 1988). The average daily weight gain were 15.4, 10.6, 14.1, 16.7 and 13.7g/day for diets containing 0, 5, 15, 25 and 35% bambara nut meal respectively. Rabbits on 5% bambara nut meal diet gained significantly less ($P<0.05$) than the rest on other treatments except those on 35% inclusion level. The inclusion level of bambara nut meal in the diet did not have any significant influence on the average final live weight of the rabbits. Feed efficiency was best with the rabbits on the 25% bambara nut meal diet even though this was not significantly different from those on the control, 35% and 15% bambara nut containing diets. The dressing percentage was significantly highest ($P<0.05$) for the rabbits on 25% and least ($P<0.05$) for those on the 5% inclusion levels. The average dressed weight of rabbits on the 25% bambara nut diet was 501.6g which was significantly higher ($P<0.05$) than those on 5% bambara nut diet. The rabbit carcass length was not influenced statistically ($P<0.05$) by the level of bambara nut in the diet. The muscle: bone ratio of rabbits on 5% bambara nut diet was significantly ($P<0.05$) less than those on 0, 15, 35 (and 25% bambara seed diets).

The data on carcass evaluation are presented in Table 1 as well. There was no significant ($P>0.05$) effect of dietary levels of bambara nut on the primal cuts of the rabbits although the best performance was observed with the rabbit fed the 25% bambara nut meal diet.

However, the pelt (skin) was significantly influenced by the diets. The heaviest pelt was produced by rabbits fed the 5% bambara nut diet which was not significantly ($P>0.05$) different

BAMBARA GROUNDNUT MEAL AND RABBIT CARCASS QUALITY.

TABLE 1: PERFORMANCE CHARACTERISTICS OF RABBITS FED GRADED LEVELS OF TOASTED BAMBARA GROUNDNUTS.

Parameters	0	5	15	25	35	SEM
Initial weight (g)	356.3	360.5	373.4	373.7	370.7	44.1
Final Liveweight (g)	960.1	817.4	977.4	1041.6	971.0	22.9
Daily wt gain (g)	15.4 ^a	10.5 ^b	14.1 ^a	16.7 ^a	13.7 ^{ab}	1.1
Daily feed intake (g)	55.3	54.8	54.6	55.6	51.4	2.4
Feed efficiency	0.28 ^a	0.22 ^b	0.26 ^{ab}	0.30 ^a	0.27 ^a	0.02
Dressed Carcass wt (g)	405.3 ^b	288.7	421.5 ^b	501.6 ^a	415.8 ^a	13.6
Dressed wt (% of live wt)	42.2 ^a	35.3 ^b	43.1 ^a	48.2 ^a	42.8 ^a	2.2
Carcass length (cm)	21.3	20.2	22.1	21.9	22.0	0.41
Meat: bone ratio	4.2 ^a	3.6 ^b	4.4 ^a	4.8 ^a	4.5 ^a	0.2
Leg	19.5	19.6	19.1	19.6	17.4	2.3
Shoulder	13.4	15.0	14.1	15.4	14.3	1.2
Loin	11.2	11.5	11.9	11.3	11.9	1.2
Ribs	6.7	7.1	7.4	7.8	6.5	0.8
Head	11.2	11.6	12.0	10.0	9.9	1.0
Pelt	21.1 ^{ab}	25.1 ^a	19.1 ^b	20.9 ^{ab}	17.9	3.5
Liver	9.1	9.9	8.7	10.3	7.8	1.8
Heart	0.7	0.7	0.5	0.6	0.5	0.2
Kidneys	1.5	1.9	1.7	1.9	1.7	0.3
Lungs	1.7	2.1	1.5	1.9	1.6	0.2
Empty guts (g)	21.4	25.5	20.1	22.5	19.2	2.1
Lipid	6.6 ^a	12.3 ^b	15.3 ^b	20.7 ^a	19.2	3.0
Moisture	58.3 ^b	66.3 ^a	67.0 ^a	73.0 ^a	68.0 ^a	4.2

Means denoted by different superscripts horizontally were significantly different ($P < 0.05$).

±SEM: Standard error of means

from those on the control and 25% bambara inclusion diet. These in turns were statistically similar to those on the 15 and 35% bambara nut meal diets.

The livers, kidneys, hearts, lungs and empty guts were not statistically influenced ($P > 0.05$) by the level of bambara nut in the diet. However, the lipid and moisture contents were significantly ($P < 0.05$) influenced by the inclusion level of bambara nut in the diets. The least lipid content was observed with the rabbits on the control diet while those on the 5 and 15% levels of bambara nut were significantly ($P < 0.05$) higher. The highest lipid content was with those on 35% bambara nut containing diet. It was observed that as the level of bambara meal was increasing in the diet the lipid content of the rabbits increased up to the 25% inclusion level. This might be explained to be due to high energy content of the bambara nut. However the slight decrease in the lipid content of rabbits

fed the 35% bambara nut diet could not be explained. The moisture content of the rabbits fed the control diet was significantly lower ($P < 0.05$) than those fed the bambara nut containing diets which was statistically similar at all levels of inclusion. Based on our observations in the study, bambara nut can best be incorporated into rabbit diets at 25% level. With a seed of this nature that is high in protein (18 - 22%) and carbohydrate (60%), its utilization in this direction as well as its increased use in human food will go a long way in solving Nigeria's food problem especially now that the cost of maize and other protein food sources are becoming too prohibitive.

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