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CARCASS AND ORGAN CHARACTERISTICS OF GROWING JAPANESE QUAILS (*COTURNIX COTURNIX JAPONICA*) FED DIETS CONTAINING BOILED *PROSOPIS AFRICANA* SEED COAT MEAL (BPASCM)

Abang, FBP, Ikyume ,T and Ina- Ibor, BO
1 Department of Animal Production, College of Animal Science,University of Agriculture Makurdi, Makurdi, Benue State -Nigeria (abang.favour@yahoo.com).
2 Federal Ministry of Agriculture Calabar, Calabar - Nigeria.

ABSTRACT: *This study aimed to evaluate the effect of replacing maize with boiled-toasted Prosopis africana seed coat meal on carcass and organ characteristics of Japanese quails. A total of three hundred (300) two-weeks-old unsexed Japanese quails were used in a seven week study. The quails were balanced for weight and equally allotted into five treatment groups of 60 birds per treatment. The control diet which contained 0% BPASCM and four other experimental diets in which maize was replaced by boiled Prosopis africana seed coat meal at 25%, 50%, 75% and 100% levels in the experimental diets constituted the five treatments (I-V) respectively. Result showed a significant (P<0.05) difference in the live weight, slaughter weight, dressed weight, breast weight, drum stick weight, back weight, shank weight and feather weight. The highest weight for all the carcass traits occurred in the control diet but was statistically similar to weights obtained in treatment group two. Organs such as intestine weight, liver weight, kidney weight, and heart weight were found to be significantly (P<0.05) affected by the replacement with boiled Prosopis africana seed coat meal (BPASCM) while others such as lungs weight, spleen weight, pancreases weight and gizzard weight were not significantly (P>0.05) influenced by replacement with BPASCM The highest weight of intestine was observed at treatment V. Liver weight and heart weight were highest in treatment II and the highest weight of kidney was recorded in the control group. The inclusion of both maize and BPASCM in the diets at 3:1 ratio respectively is recommended in the feeding of meat-type Japanese quail birds*.

KEYWORDS: Japanese quails, Carcass and organ characteristics, Maize and BPASCM.

INTRODUCTION

The inability of developing countries to adequately feed their ever increasing population with the right proportion of calories and protein has been a major developmental challenge [1]. Nigeria with a population of over 140million people over time has not been able to meet the protein intake recommendation by the Food and Agriculture organisation (FAO)[2] and this is partly adjured to the fact that the expansion of the ruminant animals' population has not progressed satisfactorily to cope with increasing demand for meat. This has given rise to an increased commercial poultry production. Poultry production however has been on a decline mainly due to high cost of feed, disease, high cost of drugs and inadequate supply of day old chicks among other factors which has led to the search for alternative cheaper sources of poultry specie and the subsequent introduction of quail birds in Nigeria [2]. Quails have been acclimatized and adapted in Nigeria in places like Kano, Benue, Kaduna, Kebbi, Borno, Oyo, Lagos, Enugu, Yobe, Akwa ibom, Niger, Kwara, Jigawa, Plateau states and Abuja [2]. The scientific designation for Japanese quails is *coturnix coturnix japonica* which is different from the common *coturnix coturnix* quail [3]. The Japanese quails have gained relevance in value as

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food animal [4] and several reasons account for the utility of this bird. It is bred for egg and meat production [5] which has a unique flavour [4]. It also has low maintenance cost due to its small body size (80-300g), short generation interval (which is usually between 3-4 generation in a year) [6], disease resistance and high egg production [7].

The increasing competition between man and livestock for available feedstuff for food, feed and industrial raw material especially with regards to the fast growing monogastric animal production [8] has made the cost of maize to skyrocket leading to increasing cost of finished feed and subsequently the cost of poultry products. Maize account for about 45-55% of poultry feed [9]. Therefore any effort to substitute maize in poultry feed will significantly reduce the cost of production. The search for alternative feedstuff has led to the discovery of non conventional energy feed such as *Prosopis africana*.

Prosopis africana seed is reported to have 42.52% crude protein, 7.93% ether extract, 4.93% crude fibre and 8.12% ash nutritional value [10]. The seed coat can be a substitute to maize because it is known to contain myriad of complex chemical compound's which are health wise beneficial to human and animals [11]. The seed of Prosopis africana is noted to contain anti-nutritional factors which include tannins, haemaglutinins, prosopine and toxic amino acids [12] and processing methods such as boiling, fermentation, sun-drying has been reported to be effective in dealing with anti- nutritional factors [13]. Therefore Prosopis africana has a potential to be used as replacement for maize in production of Japanese quails. The objective of this study was to evaluate the effect of replacing maize with Prosopis africana on carcass and organ characteristics of Japanese quails.

MATERIALS AND METHODS

Experimental site

The experiment was conducted at the poultry unit of the Teaching and Research farms of the Federal University of Agriculture, Makurdi, Benue state between the months of June and August. Makurdi is located at longitude 6°10’ east and latitude 6°8’ north. The area is warm with a minimum temperature range of 29.8-35.6°C. Rain fall is between 508-1-16mm and relative humidity is 47% [14].

Experimental design and management

Three hundred two-weeks-old Japanese quails were randomly divided into five groups in a complete randomized design with each treatment having three replicates containing twenty birds per replicate. Five experimental diets were formulated from a mixture of maize, Prosopis africana seed coat meal, soybeans, wheat offal, fish meal, blood meal, salt and vitamin premix. As shown in table 1. The birds were reared on a deep litter system in cages. The birds were kept off feed for twelve hours prior to slaughter so that their organs were free from undigested feed. At the end of the experiment, 20 birds (2 birds per replicate) were slaughtered by humanely method to ensure complete bleeding. Individual birds were weighed on an electronic scale prior to slaughter and all the individual cuts and organs were also weighed separately. Statistical analysis was carried out as outlined by [14]. The study lasted for seven weeks with one week of acclimatization and six weeks of feeding.

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Data collection
Relative carcass and organ weight was expressed as the percentage of the cut or organ weight to the live weight of the bird.

RESULTS AND DISCUSSION

Carcass traits.

The terminal carcass cut are presented in table 2. The live weight, slaughter weight, dressed weight, breast weight, drum stick, back weight and feathered weight were significantly ($p<0.05$) affected across treatment groups. The result obtained in this present study is in contrast with report by [15] who reported a significant difference in all the carcass parameters measured. In this present report, the wing weight, head weight, shank weight and feather weight did not show any significant ($P>0.05$) difference across the treatment groups and this agree with [16] who reportedly found no significant difference in any of the carcass trait when he fed broiler chicks with soaked Prosopis seed meal. The differences between this report and that of [16] could be attributed to the nutritional value of the various feed stuff; that is Prosopis seed and Prosopis seed coat. The highest numerical value for live weight, slaughter weight, dressed weight, breast weight, drum stick weight back fat weight, neck weight and defeathered weight was observed in the control group and did not differ significantly ($P>0.05$) from the values obtained in treatment II. This indicates that although control group had better terminal carcass cut but this did not significantly differ from the cuts obtained from the treatment group II birds. It should be noted that contrary to reports of this present study where all the carcass cuts decreased with increasing amount of Prosopis seed coat meal, the report by [16] indicated an increase in the selected cuts with increasing levels of Prosopis seed meal

Organ weight of Japanese quails

The result of organ weight as shown in table 3 indicates that there was a significant ($P<0.05$) in the intestine weight, liver weight, kidney weight and heart weight. This is in contrast with report by [15] who reported a significant difference in only the intestine weight. Other organs such as lungs weight, spleen weight, pancreas weight and gizzard weight were not significantly ($P>0.05$) influenced by the inclusion of Prosopis africana in the diets of Japanese quails. [16] did not report any significant ($P>0.05$) difference in the selected organs of broiler chicks fed soaked Prosopis africana seed meal. In the report by [16] as the amount of soaked Prosopis seed meal increased in the diet, the selected tissue reportedly increased in weight. In this present study, for the organs which indicated significant difference in weight, the highest values were obtained in the control group and were found to be (except for intestine weight) statistically similar to the values obtained in the treatment group two (II).

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Table 1. Composition of diet with boiled Prosopis africana seed coat meal.

Ingredient	0/100	25/100	50/50	100/25	100/0
Maize	50.00	37.50	25.00	12.50	0.00
PSM	-	12.50	25.00	37.50	50.00
Soybeans	25.00	25.50	25.50	26.00	26.00
Wheat offal	9.70	9.00	8.00	7.20	6.80
Blood meal	3.30	3.50	4.30	4.80	5.20
Fish meal	5.00	5.00	5.00	5.00	5.00
Bone meal	6.25	6.25	6.25	6.25	6.25
Salt	0.25	0.25	0.25	0.25	0.25
Vitamin premix	0.50	0.50	0.50	0.50	0.50
Total	100	100	100	100	100
Analysed nutrients:					
CP (%)	22.72	22.68	22.82	22.97	22.92
ME (kcal/kg)	3272.45	3152.01	3100.78	3096.71	3072.44

BPASCM- Boiled Prosopis african seed coat meal
CP- Crude protein
ME- Metabolizable Energy

Table 2. Effect of graded levels of Prosopis africana seed coat on terminal carcass weight of Japanese quails at nine weeks of age.

Parameter (g)	**0/100**	**25/100**	**50/50**	**100/25**	**100/0**	**SEM**
Live weight	134.33^{a}	127.50^{ab}	105.00^{c}	97.00^{c}	110.33^{bc}	6.43
Slaughter weight	113.00^{a}	105.83^{ab}	96.33^{bc}	92.00^{bc}	86.50^{c}	4.22
Dressed weight	75.85^{a}	70.60^{ab}	63.55^{bc}	60.85^{bc}	53.47^{c}	3.56
Breast weight	29.82^{a}	27.18^{ab}	24.10^{abc}	22.05^{bc}	20.82^{c}	1.74
Drum stick weight	18.82^{a}	17.43^{a}	13.97^{a}	17.35^{b}	13.25^{b}	9.43
Back weight	10.68^{a}	10.43^{a}	9.45^{ab}	9.15^{ab}	8.00^{b}	1.79
Wing weight	9.10	8.47	8.25	7.47	7.12	2.01
Neck weight	7.43^{a}	7.23^{a}	6.08^{a}	5.88^{ab}	4.40^{b}	4.95
Head weight	5.77	5.47	5.98	5.12	5.37	6.32
Shank weight	2.33	2.10	2.10	2.23	2.05	1.73
Feather weight	6.00	5.17	4.33	5.00	4.83	3.85
De feathered weight	103.83^{a}	99.00^{a}	91.33^{ab}	83.17^{b}	91.80^{b}	4.62

Means with different subscript (a, b and c) along the same row are significantly different ($P<0.05$).

SEM - Standard error of mean.

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Table 3. Effect of Prosopis africana seed coat meal on organ weights of Japanese quail at nineth week of age.

Parameters (g)	0/100	25/100	50/50	100/25	100/0	SEM
Intestine weight	6.47^{bc}	6.30^{c}	7.73^{abc}	8.43^{ab}	8.07^{a}	1.62
Lungs weight	1.43	1.77	1.38	1.13	1.22	1.93
Liver weight	2.83^{ab}	3.30^{a}	3.00^{ab}	2.53^{b}	1.63^{c}	1.84
Kidney weight	0.60^{a}	0.67^{a}	0.33^{c}	0.57^{ab}	0.43^{bc}	1.53
Heart weight	0.17^{a}	1.10^{a}	0.83^{ab}	1.07^{a}	0.67^{b}	1.06
Spleen weight	0.60	0.27	0.10	0.10	0.10	2.24
Pancreas weight	0.28	0.30	0.52	0.52	0.27	2.94
Gizzard weight	3.67	3.83	3.47	3.40	3.97	3.32

^{abc} means with different subscript along the same row are significantly different ($p<0.05$)

SEM - Standard error of mean.

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