NUTRIENT UTILIZATION OF JAPANESE QUAILS FED GRADED LEVELS OF BLACK SESAME SEED (*Sesamum indicum L.*) MEAL

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ABSTRACT
One hundred and forty-four two weeks old Japanese quails were used for six weeks to investigated the effect of graded levels of black sesame (*sesamum indicum l*) seed on growth performance of Japanese quails. The quail birds were randomly grouped into four treatments of 36 quail birds per treatments. Each treatment comprised of three replicates of 12 birds in a completely randomized design. Four experimental diets were formulated with diet 1 (control) containing 0% of Black Sesamum Seed Meal (BRSSM), while diets 2, 3 and 4 contained 5, 10, and 15 inclusion levels respectively. The Sesame Seed used for the experiments were screened and winnowed to remove sand, chaff and other foreign particles before processing into feed. The result of the experiment showed that there were significant ($P<0.05$) differences in all the parameters measured between dietary treatments. The feed intake, weight gain of quail birds diet containing 10% BSSM was significantly ($P<0.05$) higher than the control and other diets. The feed intake of the birds decreased at 10% with increase in weight gain and when compared with control, 5% and 15% respectively with low feed conversion ratio. It was concluded that BRSSM can be included in quail diet without adverse effect on the growth.
Keywords: Quail birds, black sesame seed meal, growth performance.

INTRODUCTION
Sesame (*Sesamun indicum L.*) is a drought-tolerant crop adapted to many soil types (Ram *et al.*, 1990) and the seed is a traditional health food around the world, composed of 45 to 50% lipid, 15 to 20% protein, and 10 to 15% carbohydrate. Black sesame seed meal (BSSM) may also, constitute good vegetable protein sources for use in poultry diets in regions where they are readily available and relatively inexpensive. It is an excellent source of protein ranging from 28.40% CP (El-Housseiny *et al.*, 2001) to 52.9% CP and has an amino acid composition similar to that of soyabean meal 47.7% CP (Manputu and Burh, 1991).

The Japanese quail is an important laboratory and productive bird because of its small body size, and attains sexual maturity at 6 to 7 weeks of age. It is highly prolific, has the ability to produce 3 to 4 generations in a year and has relative ease of maintaining the colony (Shim and Vohra, 1984). Among other birds, the meat and eggs of quails have less fat and low cholesterol content which is of public health importance and has been suggested as good quality meat source for diabetic patients and those with high blood pressure (Agwunobi and Ina-Ibor, 2007). To avert the problem of low animal protein deficiency, the production of animals with short generation interval such as quail is needed. This study investigated the effect of graded levels of black sesame seed (*sesamum indicum l*) on performance characteristics and heamatological indices of Japanese quails (*Coturnix coturnix japonica*).

MATERIALS AND METHODS
The research work was carried out at the poultry unit of Federal College of Animal Health and Production Technology, Vom in Plateau State, Northern Guinea Savannah Zone of Nigeria. The black Sesame Seed used for the experiments were bought from a local market in Vom, Plateau State, screened and winnowed to remove sand, chaff and other foreign particles before processing into feed. One hundred and forty-four (144), two week old Japanese quails were bought from the National Veterinary Research Institute (NVRI), Vom, Plateau State, Nigeria. The birds were randomly allocated to four dietary treatments of thirty six quails each having three replicates of twelve quails. The quails were weighed in groups and the average weight determined before being assigned to their

respective treatment groups. The birds were allowed access to feed and water *ad libitum*. Kerosene stoves were used for the first one week to supply the required heat. The birds were reared on deep litter system. Routine management operations included daily cleaning of drinkers, feeders and supply of fresh feeds and water. Four experimental diets were formulated to contain (0, 5, 10 and 15%) percentage inclusion levels of black raw Sesame seed meal respectively. The diets represented by BSSM0%, BSSM5%, BSSM10%, BSSM15%, respectively containing 19.99% -20.58% crude protein with 2826.91 Kcal/kg Metabolizable energy (Table 1). Body weight and feed intake of quails were recorded weekly and the experiment lasted 42 days. From the mean body weights and feed intake, feed conversion ratio was calculated. Body weight gain was obtained by subtracting initial body weight from final weight of the birds. The proximate analysis of experimental diets was carried out according to the procedures of AOAC, (2006) at the Biochemistry Laboratory of the National Veterinary Research Institute, Vom. Data obtained was subjected to analysis of variance (ANOVA) using the SPSS (2007) statistical software model for the completely randomized design. Where significant differences were observed, means were separated using Duncan's Multiple Range Test (DMRT) as outlined by Duncan (1955).

RESULTS AND DISCUSSION

The result of the proximate composition of black sesame seed meal (Table 2) show that the Crude protein content was 20.94%, Crude fibre, 18.79%, Ash-5.12% and Dry matter-96.43%. This result is similar to the result reported by Olomu (1978), that sesame seed contain crude protein, 22.30%; crude fibre; 10.30%; dry matter, 92.6% and ash, 5.30%. However, it varies with that of Alharthi, *et al.*, (2009) who gave the following chemical composition moisture, 8.40%; crude fibre 5.36%; crude protein, 29.52%; ether extract, 11.40%; nitrogen free extract, 40.17% and ash, 5.15%. The differences observed from the already established values can be attributed to the different sources of the sesame seed, cultivar, method of processing, length of storage and storage condition (Ojewole and Ewa, 2005). Other factors that affect nutrient composition of seeds are geographical location and soil type upon which the crop is grown, manorial treatment and stage of ripeness at which the seed was harvested Bolton and Blair, (1986). The proximate composition of the experimental diets is as shown in table2. There were significant ($P>0.05$) difference among the diets. Crude protein composition of the diets fall within the normal value (20%) for laying quails in the tropics as was reported by Lee *et al.*, (1981). Diet having 10% of black sesamum seed had higher crude protein content (20.58%) and the lowest fat (content 5.25%) than the rest of the other diet groups. The performance of Japanese quails fed diets containing black sesame seed meal is presented in Table 3. The results show that final body weight, weight gain, feed intake and feed conversion ratio were significantly ($p<0.05$) different across dietary treatments. The final live weights (150.00- 152.00) is similar to what was reported by Adesiji *et al.*, (2012). The difference weight gain could be attributed to the level of methionine present and absorbed for growth and development of Japanese quails. This result is in contrast with what was reported by Agbulu *et al.*, (2010), when they fed graded levels of black raw sesame seed meal on broiler chickens. However, 10% BSSM (162.22g) recorded higher body weights compared to 96.43 – 128.89g reported by Adesiji *et al.* (2012).

The feed conversion ratio showed (5.14 – 5.98) that there were no significant ($P>0.05$) in all the dietary treatment of BSSM based diets. However, among BSSM based diets, diet 10% had lower feed conversion ratio (5.14) numerically compared with the control of (5.98). In contrast, Agbulu *et al.*, (2010) reported that broiler chicken can utilize 3% black raw sesamum seed meal without adverse effect on performance. Processing methods will improve black raw sesamum seed effects on the utilization of the diets by increasing absorption of nutrients in livestock animals.

Results of the nutrient utilization (table 5) showed that there was significant ($P<0.05$) difference in all the parameters measured among the treatment groups. Birds fed diet 1 showed consistently higher nutrient utilization values ($P<0.05$) for crude protein and Nitrogen free extract than those fed diets 5, 10 and 15%BSSM respectively. The reduction in these parameters in the test diets may be ascribed to the negative

effects of anti-nutritional (oxalate and phytate) factors in the test diets/test ingredient thereby reducing their nutritive value. Phytic acid acts as a strong chelator, forming proteins and mineral phytic acid complexes; the net result being reduced protein and mineral bioavailability (Akande *et al.*, 2010). Diet 2 had higher value for fat while diet 4 had higher values for Ash, Crude fibre and Moisture compositions than the rest of the other diets respectively.

CONCLUSION

There was no observable negative effect on the health status of quails fed the dietary treatments. This may suggest that Japanese quails are tolerant to common poultry disease since no medication was used throughout the period of the study. This suggests that digestion and feather development processes were not affected by inclusion of BSSM in the diets. Since 10% black sesame seed meal is comparable with the control diet, it can adequately included in quail nutrition at this level without any negative effect on growth performance.

RECOMMENDATION

The performance evaluation recommended 10% BSSM inclusion into the diet of quail without adverse effect since the performance response of the birds at 10% inclusion level were statistically similar with the control diet. However, the use of black sesame seed either as replacement for methionine or as source of protein could be advantageous and economic to farms that are not close to the cities where they could source for feed ingredients. The production could still thrive successfully with a good weight gain attainable using sesame seed.

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Table 1. Percentage Inclusion Levels of Black Raw Sesame Seed Fed Japanese Quail.

Ingredients (%)	0.00	5.00	10.00	15.00
Maize	44.14	42.34	40.72	38.77

Sesame meal	-	4.14	8.14	12.42
Soya Bean Meal	38.66	36.32	33.96	31.61
Rice Offal	10.00	10.00	10.00	10.00
Fish meal	2.00	2.00	2.00	2.00
Bone meal	2.50	2.50	2.50	2.50
Lime stone	2.00	2.00	2.00	2.00
Methionine	0.10	0.10	0.10	0.10
Lysine	0.10	0.10	0.10	0.10
Premix	0.25	0.25	0.25	0.25
Salt	0.25	0.25	0.25	0.25
Enzyme (Bergazym)	0.024	0.024	0.024	0.024
Total	**100.00**	**100.00**	**100.00**	**100.00**

Table 2. Proximate Composition of Black Sesame Seed

Nutrient	% Composition
Crude protein	20.94
Crude fibre	18.79
Ether extract	31.5
Ash	5.12
Moisture	3.57
Organic matter	91.31
Dry matter	96.43

Source: Agbulu, *et al.*, 2010.

Table 3. Proximate Composition of Experimental Diets

	Dietary Treatments			
Nutrients	**T1 (0%)**	**T2 (5%)**	**T3 (10%)**	**T4 (15%)**
Protein	20.41	19.99	20.58	20.29
Fat	5.61	5.89	5.25	7.14
Moisture	9.07	10.51	11.25	11.23
Ash	10.36	9.50	10.34	10.61
CF	10.75	12.69	11.28	12.77
NFE	43.80	41.42	41.30	37.96

Table 4. The mean values for performance characteristics of quail birds fed experimental diets.

Parameters	T1 (0%)	T2 (5%)	T3 (10%)	T4 (15%)
Init. Wght (g/bird)	45.83	45.83	45.83	45.83
Fin. Wght (g/bird)	152.50^{c}	156.67^{b}	162.22^{a}	150.00^{d}
Wght gain (g/bird)	108.33	110.83	116.39	104.17
Feed intake (g/bird)	647.22	634.72	606.94	600.00
FCR	5.98	5.65	5.14	5.76

Table 5. Nutrient utilization of quail birds fed experimental diets

	Dietary Treatments			
Nutrients	**T1 (0%)**	**T2 (5%)**	**T3 (10%)**	**T4 (15%)**
Crude Protein	24.17	20.93	21.91	21.76
Ether Extract	1.55	1.69	1.26	1.31
Crude Fibre	21.04	25.06	22.19	26.29
Ash	20.15	20.56	20.70	22.43
Moisture	23.13	23.76	24.89	26.91
NFE	9.96	8.00	9.05	1.30