RESPONSE OF JAPANESE QUAILS TO DIETS FORMULATED WITH BEAN TESTA MEAL TO REPLACE WHEAT OFFAL

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ABSTRACT

This trial was drawn to investigate the response of Japanese quails to diets with bean testa meal. Four dietary groups were drawn at random from among 300 Japanese quails, acclimatised for 14 days replicated thrice with 25 birds each. The birds in all the treatments were subjected to similar management practices throughout the three-week experimental period. Diet T1 (control) had no bean testa meal (BTM), while diets T2-T4 had 2.50%, 5.00% and 7.50% BTM, which translates to 33.3%, 66.6% and 100% respectively as a replacement for wheat offal (W/O). The three-week-long growing phase ended when the quails were further divided according to sex at first lay. Throughout the trial, weekly data on growth performance were gathered. The findings revealed that BTM has moderate protein content (17.36%) and high crude fibre (20.10%). The final weight (171.00-181.00g/b), average weight gain (4.87-5.18g/b), and feed conversion ratio (4.69-4.99) were significantly influenced ($p<0.05$). It can be concluded that bean testa meal, may replace 100% wheat offal for weight gain. However, a 66.67% replacement is recommended for optimum feed conversion.

Keywords: Kitchen waste, Food waste, Performance, Japanese quail, Cowpea coat meal

INTRODUCTION

Kitchen wastes, which comprise food processing waste, food leftovers, and peels, are produced in large numbers daily (Girotto *et al*., 2015; Neha *et al*., 2021). According to the FAO, nearly one-third of the globe's meals go to waste, around 1.3 billion tonnes per year (Seberini, 2020), and rising yearly (Wang *et al*., 2019). Kitchen wastes has an abundance of organic and moisture level, giving it enormous potential for resource usage. However, if not managed properly, it can contribute to unpleasant odors and air pollution, endangering public health (Halloran *et al*., 2014). Traditional kitchen waste disposal methods include safe landfills, combustible and biological composting (Sharma *et al*., 2020). Bean testa meal, on the other hand, is typically discarded as kitchen trash. Feed cost and the cost of animal products have necessitated finding alternative means of producing high-quality protein (Ojediran *et al*., 2017).

The feed cost accounts for 70-82% cost of poultry production and this caused reduced consumption of meat and animal products, especially during the austerity period. Rearing of animals with reduced cost of production, and urban rearing potentials with minimal resources has been advocated. Such an animal is the Japanese quail. Japanese quail (*Coturnix japonica*) is highly valued for eggs and meat (Genchev, 2018). These birds are known for their early sexual maturity in 35 days. This study was designed to evaluate the response of Japanese quails to diet with bean testa meal.

MATERIALS AND METHODS

The experiment was carried out at the Poultry Unit of the Teaching and Research Farm of Ladoke Akintola University of Technology, Ogbomoso, Oyo state. Bean testa meal was sourced locally. A total of three hundred 1-d old Japanese quails was obtained, acclimatized for two weeks on a 3,000 kcal/kg ME and 28% CP diet and were assigned into 4 treatments replicated thrice times with 25 birds each.

The birds in all the treatments were subjected to similar management practices throughout the five weeks' experimental period. Diet T1 (control) had no bean testa meal, while diets T2, T3 and T4 had 2.50%, 5.00% and 7.50% which translates to 33.3%, 66.6% and 100%, respectively as replacement for wheat offal. The diet contained 52.00% maize, 4.00% fish meal, 23.00% soybean meal, 2.00% palm kernel meal, 2.00% bone meal, 1.35% limestone, 0.20% lysine, 0.20% methionine, 0.25% premix and 0.25% salt as fixed ingredients

Table 1: Gross formulation of the diets (Grower phase 14-35 days)

Ingredients (%)	Diets T1	Diets T2	Diets T3	Diets T4
Wheat offal	7.50	5.00	2.50	0.00
Bean testa meal	0.00	2.50	5.00	7.50
*Fixed ingredients	92.50	92.50	92.50	92.50
Total	100.00	100.00	100.00	100.00
Nutrient composition				
ME (Kcal/kg)	2925.83	2951.26	2976.68	3002.11
Crude protein	22.53	22.65	22.78	22.90

*Fixed ingredients - 52.00% maize, 4.00% fish meal, 23.00% soybean meal, 2.00% palm kernel meal, 2.00% bone meal, 1.35% limestone, 0.20% lysine, 0.20% methionine, 0.25% premix and 0.25% salt as fixed ingredients

Data collection

Data were gathered on growth performance (starting weight, final weight, total weight gain, average daily weight gain, total feed intake, and feed conversion ratio) following Ojediran *et al*. (2017).

Laboratory and data Analysis

The proximate composition (dry matter, crude protein, crude fibre, ether extract, ash and nitrogen-free extract) of the dried sample and feed was determined using the procedures of AOAC (2000). Data generated were analysed using ANOVA and means were separated using Duncan Multiple Range Test of SPSS v25

RESULTS AND DISCUSSION

Proximate composition of bean testa meal

The proximate content of bean testa meal (BTM) revealed that it contains 90.90% DM, 17.36% CP, 20.10% CF, 1.60% EE, 10.00 ash, 41.84%, NFE. This shows that BTM is a moderate protein source unlike cashew kernel meal (15.25-38.12%) (Ojediran *et al*., 2021; 2024) and excellent fibre sources like palm kernel cake (Ojediran *et al*., 2020, 2022a) higher than cassava vinasse (Ojediran *et al*., 2019) and tigernut composite meal (Ojediran *et al*., 2022b).

Table 2: Proximate composition of bean testa meal

Parameters	%
Dry matter	90.90
Crude protein	17.36
Crude fibre	20.10
Ether extract	1.60
Ash	10.00
Nitrogen free extract	41.84

Growth performance of Japanese quail fed bean testa meal

The growth performance of Japanese quail given bean testa meal is presented in Table 3. Final weight (171.00-181.00g/b), average weight gain (4.87-5.18g/b), and feed conversion ratio (4.69-4.99) were significantly affected ($p<0.05$). Birds fed T1 had a higher final weight (181.00g/b), while those fed T2 had the lowest (171.00g/b), although those fed T3 (175.50g/b) and T4 (179.02g/b) were equivalent. Japanese quails fed diet T1 had the lowest feed conversion ratio (4.69), comparable to those fed T3 (4.83). The observation on growth parameters is unlike the report of Ojediran *et al*., (2019 and 2020) when cassava vinasse and PKC were fed to quails resulting in depressed weight and high feed conversion ratio. The feed intake suggests that the fibre level in the diet was tolerable for the quails.

Table 3 Growth performance of Japanese quails fed bean testa meal

Parameters	T1	T2	T3	T4	SEM	P- value
Initial weight (g/b)	72.19	71.76	73.16	72.74	0.36	0.06
Final weight (g/b)	181.00^{a}	171.00^{b}	179.02^{ab}	175.50^{ab}	1.09	0.05
Average daily weight gain (g/b)	5.18^{a}	4.87^{b}	5.04^{ab}	4.89^{b}	0.05	0.05
Average daily feed intake (g/b)	23.97	24.28	24.33	24.41	0.09	0.41
Feed conversion ratio (g/b)	4.69^{b}	4.99^{a}	4.83^{ab}	4.99^{a}	0.05	0.05

^{ab} means along the same row with different superscripts are significant ($p>0.05$) different

CONCLUSION AND RECOMMENDATION

Bean testa meal, a kitchen waste, may be used to replace 100% wheat offal for weight gain; however, a replacement rate of 66.67% is advised for optimal feed conversion.

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