

SHORT-TERM LAYING PERFORMANCE OF JAPANESE QUAILS (*Coturnix coturnix japonica*) FED DIFFERENT LEVELS OF BAKERY WASTE DIETS

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ABSTRACT

A six-week feeding trial was conducted to investigate the effect of feeding bakery waste meal (3.32% CP, 3221.88kcal/kg ME) on laying performance of Japanese quail birds. Four isonitrogenous (20%CP) diets were compounded. The control diet (A) had zero bakery waste. The other three diets (B, C and D), had 33.33, 66.67, and 100% of maize (respectively) replaced by bakery waste meal. One hundred and twenty (120) point-of-lay (POL) female quails were randomly assigned the experimental diets at thirty birds per diet in a completely randomized design and were offered feed and water *ad libitum*. Each diet was replicated thrice. Feed intake (26.11, 24.70, 22.97, 23.01g/b/day), water intake (57.32, 52.67, 53.11, 51.32ml/b/day), weight gain (2.28, 1.67, 2.37, 1.52g/b/day), feed conversion ratio (5.54, 3.11, 4.36, 3.97) did not differ significantly ($P>0.05$) from the control. Hen-day egg production (61.28, 68.22, 68.43, 56.19%), hen-housed egg production (61.27, 65.87, 66.19, 56.19%) and egg weight (8.80, 9.47, 9.57, 9.60g) were similar across the treatments. Results show that bakery waste meal could completely replace maize in the diet of laying Japanese quails without having adverse effects on performance.

Key words: Feed intake, weight gain, laying performance, Japanese quails

INTRODUCTION

Japanese quails are prolific (Robbins, 1981) and are low in body fat and cholesterol. They are small-bodied, weighing on average about 180 grams at maturity. This fast growing nature of this farm animal will enhance consumption of quality animal protein by growing human population.

Bakery waste consists mainly of dough, sugar, icing, butter and probably other edible products used in the bakery. Tons of bakery wastes are produced annually from different bakeries scattered all over this Country. Al-Tulaihan *et al.* (2004) reported that up to 30% of dried bakery waste can be included in broiler diet without adverse effect on performance. Egg production and feed conversion ratio had been reported not to be significantly affected by bakery by-product

meal even at 100% replacement of maize for laying chicken (Torki and Kimiaee, 2011). Recommended levels of some nutrients (CP, 20; ME, 2,553kcal/kg) when maintained in the feed is useful in achieving optimal performance in laying Japanese quails, (Edache *et al.*, 2012).

The objective of this study is to investigate the effect of feeding bakery waste meal on laying performance of Japanese quails.

MATERIALS AND METHODS

Birds and management: 120 point-of-lay Japanese quail birds obtained from the National Veterinary Research Institute poultry farm were used in this study. They were uniform in size and body conformation and housed in deep litter house partitioned into 12 units with wire mesh to allow for adequate ventilation. There were 10

birds per unit. Each diet was randomly allocated three units of cages in a completely randomized design. All birds from each unit were weighed at the beginning and weighed weekly for six weeks. The experimental diets were designated A, B, C and D. Diet A contained no bakery waste meal. Feed and water were given *ad libitum* for six weeks.

Bakery waste: Bakery waste was collected from several bakeries in Bukuru, Jos South LGA of Plateau State. They were dried and crushed into meals and incorporated into the diets free from mould and weevils. They were analyzed for proximate composition (AOAC, 2000).

Experimental diets: Five isonitrogenous (20%CP) diets containing graded levels (0, (control), 33.33, 66.67 and 100%) of bakery waste meal at the expense of maize were used in this study (Table 1). The diets were designated A, B, C and D respectively and contained metabolizable energy (ME) levels; 2622.48, 2579.40, 2536.32 and 2510.57 kcal/kg respectively.

Data Collection: The mean weekly body weights and feed intake were recorded throughout the experimental period. From the mean body weight and feed intake, feed conversion ratio was calculated. Hen-day and hen-housed egg production and egg weight were recorded throughout the experimental period. Feed cost/kg diet was calculated from prevailing local market price of feed materials. Data collection was subjected to one-way analysis of variance; ANOVA (Steel and Torrie, 1980).

RESULTS AND DISCUSSION

Proximate composition of bakery waste samples in this study compare closely to values reported by Al-Tulaihan *et al.* (2004) and Al-Ruquaie *et al.* (2011). The composition of bakery waste used in this study showed that it contained; moisture, 5.15%; crude protein, 3.32%; crude fibre, 0.00%; ether extract, 2.09%; total ash, 1.25%; N.F.E, 87.79% and dry matter, 94.45%. Values for crude protein and crude fibre were not

close to values reported by Al-Tulaihan *et al.* (2004) and Al-Ruquaie *et al.* (2011). Crude protein was higher (12.22 – 12.93%) in their samples than what was reported in this study probably because of the type of materials used in bakeries in the Middle East. Samples studied in this locality showed zero content for crude fibre as against 0.18 – 0.53% in previous studies (Al-Tulaihan *et al.*, 2004; Al-Ruquaie *et al.*, 2011) possibly due to the same factor observed earlier. Also the energy level of the sample used in this study was lower than that (3,854 – 3,895 kcal/kg ME) reported by previous authors (Al-Tulaihan *et al.*, 2004; Al-Ruquaie *et al.*, 2011). Data on initial weight, final weight, feed intake, weight gain and feed conversion ratio (Table 2) showed no significant differences on bakery waste diets as compared to the control. Ayanrinde *et al.* (2014) had reported similarity in initial weight, feed intake, weight gain and final weight between broiler finishers on bread waste diets and those on the control. This agrees with the report of this study. The non-significant effect of the diets on feed intake, weight gain and feed conversion ratio in this study has been reported earlier (Al-Ruquaie *et al.*, 2011). The lack of significant effect of the diets on feed conversion ratio in this study is similar to the report of Torki and Kimiaee (2011) for laying chicken fed bakery by-products.

Hen-day and hen-housed egg production values were similar between the control and the test diets. Similar observation was reported in laying chickens fed bakery products (Torki and Kimiaee, 2011). However, they reported significant effect of the diets on egg weight in the first two weeks of their work but that in the last two weeks the values for egg weight were similar to the control. This in part confirms the report of this study.

CONCLUSION

The escalating cost of poultry feed could effectively be alleviated by the use of cheaper resources like bakery waste. Comparison of the

mean values of parameters measured showed no significant difference ($P>0.05$) with the control. Therefore, maize can completely be replaced by bakery waste for profitable egg laying performance of Japanese quails.

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Table 1: Percent ingredient composition of experimental diets for laying quails

Ingredients	A	B	C	D
Maize	38.67	23.76	8.85	-
Bakery waste	0	12.89	25.78	33.40
Ground nut cake	26.63	28.68	30.67	31.90
Fish meal	1.50	1.50	1.50	1.50
Palm kernel cake	20.00	20.00	20.00	20.00
Bone meal	2.00	2.00	2.00	2.00
Limestone	6.50	6.50	6.50	6.50
*Vitamin Premix	0.25	0.25	0.25	0.25
Salt	0.25	0.25	0.25	0.25
Lysine	0.10	0.10	0.10	0.10
Methionine	0.10	0.10	0.10	0.10
Total	100	100	100	100
C.P (%)	20.00	20.00	20.00	20.00
M.E (kcal/kg)	2622.48	2579.40	2536.32	2510.57
Ca (%)	3.21	3.23	3.35	3.26
P (%)	0.49	0.52	0.55	0.57
C.F (%)	4.98	4.79	4.59	4.48
Cost/kg diet (N)	75.19	69.90	64.51	61.34

Table 2: Effects of different levels of bakery waste meal on laying performance of Japanese quails

Parameters	A	B	C	D	SEM
Initial weight (g)	108.33	105.00	110.00	117.67	±17.44 ^{NS}
Final weight (g)	187.33	183.33	181.85	160.00	±26.86 ^{NS}
Feed intake (g/bird/day)	26.11	24.70	22.97	23.01	±1.76 ^{NS}
Water intake (ml/bird/day)	57.32	52.67	53.11	51.32	±5.21 ^{NS}
Weight gain (g/bird/day)	2.28	1.67	2.37	1.52	±0.50 ^{NS}
Feed/gain ratio	5.54	3.11	4.36	3.97	±2.97 ^{NS}
Hen-day egg production(%)	61.28	68.22	68.43	56.19	±7.53 ^{NS}
Hen-housed egg prod.(%)	61.27	65.87	66.19	56.19	±7.53 ^{NS}
Egg weight(g)	8.80	9.47	9.57	9.60	±0.50 ^{NS}

a, b, means with same superscripts letters within rows are not significantly ($P>0.05$) different. SEM, standard error of mean. N.S = not significant, A, control (no bakery waste; B, diet with 33.33% bakery waste; C, diet with 66.67% bakery waste; D, diet with 100 bakery waste.