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## Growth performance of growing quails (*Coturnix japonica*) fed graded levels of Neem

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### Abstract

Six weeks feeding trail was conducted to determine the growing performance of Japanese quails fed graded levels of Neem (*Azadirachta indica*) leaf meal. One hundred and twenty Japanese quails (*Coturnix Coturnix Japonica*) were randomly allocated to four dietary treatments. In each of the four diets, sun-dried neem (*Azadirachta indica*) leaf was used to replace maize partially at 0, 5, 10 and 15 percentages respectively. Feed intake was measured daily, and the quails were weighed once weekly. Feed and water were given *ad-libitum*. Performance records were taken while the body composition, were also analysed at the end of the experiment. There were significant differences in weekly feed consumption, week feed conversion, final body weight ( $P<0.05$ ) across the treatments. However, there were no significant ( $P>0.05$ ) differences in body weight gain and other carcass traits. The nutrient content of diet is a major determination of the performance of the Japanese quails.

**Keywords:** Neem leaf, Japanese quails, growing performance

### 1. Introduction

Due to serious problems posed by stiff competition for feed stuffs energy and protein between humans and livestock, other available but neglected cheaper novel feed resources have been focused areas of recent research. One of such cheaper feed resources is the neem leaf. The neem leaf (*Azadirachta indica*) is a hardy plant from the family Meliaceae. It is popularly known as Neem tree and is native of India and Burma, and is adapted favourably to areas with severe drought, poor, shallow and even saline soil [1]. The Neem leaves, neem oil and de-oiled neem seed cake are used as animal feeds [1]. The Neem leaves contain appreciable amounts of proteins, minerals, carotene and adequate amount of trace minerals [2]. Neem tree as one of the most researched tree in the world has attracted world-wide prominence due to its vast range of medicinal properties like antibacterial, antiviral, antifungal, antiprotozoal, hepatoprotective and various other properties without showing any adverse effects [3]. The neem leaf meal has been extensively researched in the chickens [4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16]. In all of these studies in chicken, the neem leaf meal has been reported to have positive impacts on the studied parameters at varying dietary inclusion levels.

Since quail production is gaining attention and more patronage in Nigeria, due to the advantages associated with it, meat is lean, and its eggs and meat are low in cholesterol [17], more efforts are now geared towards its production as well as finding for it non-conventional alternative cheaper feed resources. Of all these alternative feed resources in quail production, neem leaf has received very little attention. Therefore the present study was conducted to add to the very few available data [18] on the effects of graded levels of neem leaf dietary inclusion on the performance of growing quails.

### 2. Materials and methods

#### 2.1 Birds management and experimental designs

The present study was conducted in the poultry unit, livestock farm of Niger State College of Agriculture, Mokwa. Mokwa is located at latitude  $9^{\circ}17'38''$  North and longitude  $5^{\circ}3'16''$  East [19]. The leaves of neem (*Azadirachta indica*) were harvested from around the Niger State College of Agriculture, Mokwa, Nigeria. The method of neem leaf meal preparation as described by Esonu BO *et al.* [6] was used.

Briefly, the leaves were chopped for faster and effective drying. The chopped leaves were sun-dried for three days until they became crispy while still retaining the greenish colouration. The dried leaves were milled using a hammer mill to produce a leaf meal. Sample of the leaf meal was then subjected to proximate analysis according to [20]. Four experimental growing diets were formulated such that they contained Neem (*Azadirachta indica*) leaf meal at 0.0%, 5.0%, 10.0% and 15.0% dietary levels respectively. 120 day old quails were randomly divided into four treatments in a completely randomised design, with each treatment further replicated in three of ten birds per replicate. The birds were weighed at the beginning and end of the experiment. Fresh, clean water and feed were supplied *ad-libitum*. Data on weekly feed consumption, weekly weight gain, weekly feed conversion ratio and final body weight were recorded. At the end of 6<sup>th</sup> week, randomly selected six quails (two from each replicate) from each

treatment were deprived of feed, but not water for about 12 hours, and then slaughtered using *Halal* method of slaughtering [21]. Carcass weight and eviscerated carcass traits were recorded.

**2.2 Statistical analysis**

Data collected were recorded as means ± SEM (Standard Error of mean) and were subjected to Analysis of Variance (ANOVA) using Statistical Package for the Social Sciences (SPSS version 17). Where there was difference in means, they were separated as per Turkey’s Honestly Significant Difference (HSD). Values of ( $P \leq 0.05$ ) were considered significant.

**3. Results and Discussion**

The proximate composition of the experimental neem (*Azadirachta indica*) leaf meal is shown in **Table 1**, while the composition of the experiment diet is shown in **Table 2**.

**Table 1:** Proximate composition of experimental neem leaf diet

S/NO	Identification	% Moisture content	% Ash content	% Crude fibre	% Crude protein	% Crude fat	% Nitrogen Free Extract
1	0%	6.375	7.375	4.950	19.180	6.675	55.445
2	5%	5.250	10.800	5.275	22.810	7.230	48.635
3	10%	7.025	8.125	6.100	25.095	8.095	45.560
4	15%	7.325	11.825	7.350	20.485	7.265	45.750

**Table 2:** The composition of the treatment diets

Ingredient	Diet 0%	Diet 5%	Diet 10%	Diet 15%
Maize	58.00	55.10	52.20	49.30
Neem leave	0.00	5.00	10.00	15.00
Fish meal	9.00	8.50	8.10	7.60
Lime stone	1.68	1.60	1.51	1.43
Salt	0.30	0.29	0.27	0.26
Bone meal	0.50	0.48	0.45	0.43
Vitamin premix(chicks)	0.50	0.48	0.45	0.43
Methionine	0.02	0.02	0.02	0.02
Soya beans meal	30.00	28.50	27.00	25.50
Total	100	100	100	100

Premix contained the following: (Univit 15 Roche) 1500 I.U. Vit A, 1500 I.U. Vit D, 3000 I.U. Vit E, 3.0g Vit K, 0.3g Vit B<sub>2</sub>, 8.0g Vit B<sub>6</sub>, 0.3g Vit B<sub>12</sub>, 3.0g Nicotinic Acid, 5.0g Ca-Pantothenate, 10.00g Fe, 0.2g Al, 3.5g Cu, 0.15g Zn, 0.02g I, 0.01g Co, 0.01g Se.

Data on growth performance and dress carcass characteristics of growing quails on the various dietary levels of the leaf meals are presented in Table 3. There were significant differences in weekly feed consumption, week feed

conversion, final body weight ( $P < 0.05$ ). However, there were no significant ( $P > 0.05$ ) difference in the body weight gain and other carcass traits.

**Table 3:** Effects of different dietary levels of neem leaf meal on performance of growing quails

Parameters	0%	5%	10%	15%
Weekly feed consumption	106.00 <sup>b</sup> ±69.20	1779.00 <sup>b</sup> ±187.20	3496.17 <sup>a</sup> ±364.51	3814.12 <sup>a</sup> ±231.23
Weekly weight gain	19.52 <sup>a</sup> ±9.33	11.65 <sup>a</sup> ±3.94	14.07 <sup>a</sup> ±5.57	10.98 <sup>a</sup> ±4.38
Weekly feed conversion ration	4.91 <sup>a</sup> ±0.84	4.08 <sup>a</sup> ±1.20	5.53 <sup>a</sup> ±1.46	6.00 <sup>a</sup> ±2.12
Final body weight	484.00 <sup>a</sup> ±213.26	366.00 <sup>a</sup> ±16.81	102.39 <sup>b</sup> ±5.54	96.44 <sup>b</sup> ±4.11
Eviscerated carcass weight	100.00 <sup>a</sup> ±4.00	91.00 <sup>a</sup> ±3.00	94.00 <sup>a</sup> ±4.00	106.00 <sup>a</sup> ±2.00
Carcass weight	126.00±4.00	114.00±0.00	118±4.00	131.00±5.00
Hind limb weight	10.00 <sup>a</sup> ±0.00	8.00 <sup>a</sup> ±0.00	10.00 <sup>a</sup> ±0.00	9.50 <sup>a</sup> ±0.33
Wing weight	5.00 <sup>a</sup> ±1.00	4.00 <sup>a</sup> ±0.00	3.00 <sup>a</sup> ±1.00	4.00 <sup>a</sup> ±0.38
Breast weight	29.00 <sup>a</sup> ±1.00	27.00 <sup>a</sup> ±3.00	26.00 <sup>a</sup> ±2.00	35.00 <sup>a</sup> ±1.00
Heart weight	2.00 <sup>a</sup> ±0.00	2.00 <sup>a</sup> ±0.00	2.00 <sup>a</sup> ±0.00	2.00 <sup>a</sup> ±0.00

<sup>a, b</sup> means within a row with different superscripts are significantly different at ( $p < 0.05$ )

Quails on the 0% neem leaf diets performed generally better than those on the neem leaf meal diets. The higher feed intake recorded by the quails on the neem leaf diet might be as a result of low energy values of the feed due to high fibre content which had an energy dilution effect on these diets and a consequential increase in feed intake<sup>[6]</sup>. This result agrees with those obtained using broilers by<sup>[6, 12, 22, 23, 24]</sup>. The result obtained further reaffirms the result earlier obtained in growing quails by Elangovan AV *et al.*<sup>[25]</sup> that incorporation of 5 to 10% dehulled neem oil meal (solvent extracted) decreased slightly growth performance, while inducing mild pathological effects. However, this result contradicts reports of Ash AJ *et al.*<sup>[26]</sup> and Esonu BO *et al.*<sup>[27]</sup> with broilers.

#### 4. Conclusion

The result of this investigation showed that inclusion of neem leaf meal (*Azadirachta indica*) up to 5% dietary levels can be used as growth promoters in the Japanese quail diets without serious adverse effects. It was evident that low energy diet led to poor performance despite the high quantity of feed consumed by quail in treatment 5%, 10% and 15%. It was also observed that quail fed 0% (T<sub>0</sub>) which contain high energy diet performed favourably well, compared to those with low energy diet (T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>).

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