

**DIETARY SUPPLEMENTATION OF TURMERIC OIL (*Curcuma longa*)  
AND GARLIC POWDER (*Allium sativum*) ON GROWTH  
PERFORMANCE OF MEAT TYPE JAPANESE QUAIL  
(*Coturnix japonica*)**

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**Abstract:** The present study was aimed to investigate the dietary effect turmeric oil, garlic powder and its combination on the performance of Japanese quail. Five experimental rations designated as T0-Basal diet without antibiotic, T1- Basal diet with antibiotic(400g/ton), T2- Basal diet with Turmeric oil (0.5 lt/ton), T3 - Basal diet with garlic powder (400 g/ton) and T5- Basal diet with Turmeric oil + garlic powder, were fed to 150 Japanese quail chicks, randomly distributed into all 5 treatments (3 replicates per treatment). Average weight gain, feed consumption, feed efficiency and survivability were used as criteria of response to feeding. Based on the trail it could be concluded that Japanese quail can be fed with turmeric oil or garlic or its combination without any antibiotic with no significant loss in productivity. Turmeric oil or garlic or its combination could very well be an effective replacement for antibiotic in quail rearing.

**Keywords:** Japanese quail, Turmeric oil, Garlic powder, Production performance.

## **INTRODUCTION**

The search for natural alternatives to antibiotic growth promoters in order to maintain both performance and health in farmed animal is on the rise due to antibiotic residues in livestock and poultry products. Turmeric is a tropical plant native to southern and south eastern tropical Asia. It is traditional to use turmeric as a food spice, colorant and medicine in many Asian countries including India (HMPC, 2009). Also turmeric is said to improve digestion and nutrient metabolism. Curcumin is the main important bioactive ingredient responsible for the biological activity of turmeric. Curcumin has been shown to have several biological effects, exhibiting anti-inflammatory (Holt et al., 2005), antioxidant and hypolipidaemic (Ramirez Tortosa et al., 1999) activities.

Garlic (*Allium sativum* L) is bulbous vegetable, well known spice and medicinal plant, which belongs to the family *Liliaceae* and genus *Allium*. Garlic has a special place because of its broad spectrum of action and availability to poultry farmers (Fadlalla et al., 2010). These features are the result of the actions of bioactive compounds that are contained within (Suriya, 2012), the most important of which are organic sulphurous compounds aliin, allicin,

ajoene and allylpropyl disulphide and diallyl trisulphide, sallylcysteine and others (Mansoub, 2011). Considering the medicinal attributions of turmeric and ginger the present study evaluates the growth performance of Japanese quail fed on corn/soy-based diets.

## MATERIAL AND METHODS

### Location of the study

The experiment was conducted at the College of Poultry Production and Management (CPPM), Hosur, Tamilnadu – 635110 wherein a temperate climate prevails.

### Birds, diets and management

A total of 150 newly-hatched straight run Japanese quail chicks was procured from the hatchery of Poultry farm Complex, CPPM, Hosur and was randomly allocated into 5 treatments of 30 each so as to have 3 replicates per treatment. Five experimental rations designated as: T0-Basal diet without antibiotic, T1- basal diet with antibiotic (400g/ton), T2-Turmeric oil (0.5 lt/ton), T3 - garlic powder (400 g/ton) and T5- Turmeric oil with garlic powder. All the chicks were fed a corn-soybean based diet (Table 1) for 28 days of experimental period in two phases viz. Starter (0-14 days), Grower (14-28 days). Standard brooding practices were followed. Feed and water were provided *ad lib* and chicks had access to light according to a 23L/1D program.

**Table 1. Composition of the experimental diets fed to Japanese Quail**

Ingredient	Chick mash (100 kg)	Grower mash (100 kg)
Maize	48	56
Soyabean meal	46	38
Salt	0	0.5
Calcite	2	2
DCP	2	1.8
Rice bran oil	1	1.7

*# Trace mineral and vitamins were added as per commercial recommendation*

### Parameters studied

During the experimental period (4-weeks), growth performance, body weight, live weight, feed efficiency of the birds was evaluated. Feed conversion ratio (FCR) was calculated as the total feed consumption divided by weight gain in each replicate. Survivability percentage was calculated as the total Japanese quail survived divided by the number of starting birds multiplied by 100.

### Data analysis

Data on different variables were subjected to analysis of variance (ANOVA) in a Completely Randomized Design (CRD) (Steel and Torrie, 1980).

### RESULTS AND DISCUSSION

Body weight of Japanese quail starter-grower fed with different dietary group is depicted in table 2. Highest body weight was recorded in group fed with T3- garlic (214.20 g) at the end of the trial period followed by T0, T1, T2 and T4 respectively. No significant variation was noticed between the various dietary treatments at the end of growing period.

**Table 2. Mean body weight (g) of Japanese quail upto 4<sup>th</sup> week on different dietary treatments**

Treatment/Age	o day	1 week	2 week	3 week	4 week
Basal diet (T0)	10.03±2.06	30.50±6.43	<b>72.10<sup>a</sup> ±13.76</b>	122.97±25.64	214.37±20.65
OTC (T1)	10.67±2.15	32.30±5.53	68.63±16.26	126.27±14.03	212.23±23.74
Turmeric(T2)	10.53±1.89	29.23±4.01	<b>61.80<sup>a</sup>±12.77</b>	118.07±21.54	204.23±23.80
Garlic(T3)	10.70±2.26	31.40±4.68	65.80±12.25	124.60±21.88	<b>214.20±18.07</b>
Turmeric + Garlic (T4)	11.07±2.10	30.47±5.48	66.27±15.51	117.40±23.23	200.93±30.75
Mortality %	0	0	0	0	0

The mean weekly body weight gain of Japanese quail starter-grower is depicted in table 3. Highest body weight gain was recorded in T3 during 1<sup>st</sup>, 3<sup>rd</sup> and 4<sup>th</sup> week. Basal diet (T0) showed high body weight during the second week alone.

**Table 3. Mean weekly body weight gain (g) of Japanese quail upto 4<sup>th</sup> week on different dietary treatments**

Treatment/Age	1 week	2 week	3 week	4 week
Basal diet (T0)	20.47	41.60	50.87	91.40
OTC (T1)	21.63	36.33	57.63	85.97
Turmeric(T2)	18.70	32.57	56.27	86.17
Garlic(T3)	20.70	34.40	58.80	89.60
Turmeric + garlic (T4)	19.40	35.80	51.13	83.53

The result showed the best FCR in T5 followed by T1 and T2. No significant variation was noticed between the treatments. Inclusion of Turmeric or garlic or its combination with no antibiotic resulted in performance which was on par with the group fed with antibiotic. The

results of the trial were in accordance with Kilany et al., 2014. The significant increase in feed conversion in Garlic (T3) and in turmeric oil (T2) or their combination (T4) may be due to antioxidant activity and better absorption due to increased gut enzyme secretion. The results were in agreement with the findings of Durrani et al., 2006 and Raghdad and Al-Jaleel, 2012.

**Table 4. Weekly Feed conversion ratio (FCR) in Japanese quail fed on experimental diet**

Treatment/Age	1 week	2 week	3 week	4 week
<i>Basal diet (T0)</i>	1.83	2.89	3.34	2.63
<i>OTC (T1)</i>	1.73	2.89	2.95	2.79
<i>Turmeric(T2)</i>	2.01	3.22	3.02	2.79
<i>Garlic(T3)</i>	1.81	3.05	2.89	2.68
<i>Turmeric + garlic (T4)</i>	1.93	2.93	3.32	2.87

The cost benefit ratio involved in Japanese quail production is higher than other diversified poultry production along with good market demand makes Japanese quail farming one of the best suited venture for small and marginal farmers towards better livelihood. Based on the trail it could be concluded that Japanese quail can be fed with turmeric oil or garlic or its combination without any antibiotic with no significant loss in productivity.

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