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## Effect of supplementation of neem, ginger and garlic powder on carcass characteristics in commercial layers

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### Abstract

An experiment was conducted to study the effect of neem, ginger and garlic powder on carcass characteristics in commercial layers. Five hundred layer birds of twenty eight weeks age were distributed into 25 replicates of 20 birds each. Basal diet (T<sub>1</sub>) and the experimental diets were prepared by incorporating garlic powder @ 0.5% (T<sub>2</sub>), neem powder @ 0.5% (T<sub>3</sub>), ginger powder @ 1% (T<sub>4</sub>) and garlic @ 0.5%, neem @ 0.5% and ginger powder @ 1% in combination (T<sub>5</sub>). The duration of the experiment was 20 weeks divided into 5 phases of 4 weeks each. At peak production stage (45<sup>th</sup> week) of the experiment, two birds from each replicate in different treatment groups respectively were sacrificed and the weight of organs such as heart, liver, kidney and gizzard were taken during the slaughter of the birds and expressed as per cent of live body weight. Feeding of neem, ginger and garlic powder revealed no significant difference ( $P \leq 0.05$ ) in the weight of heart, liver, kidney and gizzard. It was concluded that feeding neem, ginger and garlic powder had no significant impact on the carcass characteristics in commercial layers.

**Keywords:** neem, ginger, garlic, layers, carcass and body weight

### Introduction

Poultry plays a significant role in the provision of animal protein need in developing countries (Maidala and Istifanus 2012) <sup>[1]</sup>. The use of synthetic drugs as antibiotics growth promoters that enhance growth as well as improvement in poultry performance is considered as a remedy for preventing infectious diseases. However, antibiotics growth promoters have certain drawbacks which include increased production cost, prolonged withdrawal period and risk of its accumulation in tissues which could have harmful effects on human health (Jawad *et al.* 2004) <sup>[2]</sup>. So the present research aims at identifying the potential alternatives to antibiotic growth promoters. The methanol extract of *A. indica* leaves shows antibacterial activity against *Bacillus subtilis*, *Staphylococcus aureus*, *Proteus vulgaris*, *Salmonella typhi* and *Pseudomonas aeruginosa* (Grover *et al.* 2011) <sup>[3]</sup>. Ginger used as a substitute for antibiotic growth promoters is desirable for greater productivity in poultry, increased palatability of feed, nutrient utilization, appetite stimulation, increased gastric juice flow (Owen and Amakari 2011) <sup>[4]</sup>. Garlic (*Allium sativum*) is one of the most recognized plant species used for organic poultry production. It has anti-bacterial, anti-viral, anti-fungal, and anti-parasitic properties (Ayed *et al.* 2018) <sup>[5]</sup>.

Thus keeping in view the beneficial effects of neem, ginger and garlic the experiment was conducted by supplementing the above plant derivatives to commercial layers to assess their carcass characteristics.

### Material and Method

A total of five hundred layer birds of twenty eight week age were selected and the birds were reared by feeding the basal diet for 2 weeks for acclimatization. The birds were allocated into five treatment groups with 20 birds per replicate and 100 birds per treatment. The birds were fed in two phases, layer phase I and layer phase II diets as per BIS (2007). From the 31<sup>st</sup> week the birds were fed with the respective experimental diet till the completion of the experiment at the 50<sup>th</sup> week. The trial duration was for 20 weeks (31<sup>st</sup> week to 50<sup>th</sup> week) and this duration was divided into five phases of 4 weeks each. The basal diet (control-T<sub>1</sub>) was formulated as per the standard recommendations of BIS (2007) nutrient requirements. The treatment group

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T2, T3 and T4 were supplemented with garlic powder 0.5 per cent, neem powder 0.5 per cent and ginger powder 1 per cent, respectively. The treatment group T5 was supplemented with garlic powder 0.5 per cent + neem powder 0.5 per cent + ginger powder 1 per cent. All the procedures followed during the trial were approved by the Institutional Animal Ethical Committee, Veterinary College, Hebbal, Bengaluru, Karnataka.

### Carcass characteristics

At the 45<sup>th</sup> week of the trial (peak stage of production), ten birds from each treatment (two birds from each replicate) were sacrificed.

The weight of organs such as heart, liver, kidney and gizzard were taken during the slaughter of the birds on the 45<sup>th</sup> week of the experiment and expressed as per cent of live body weight.

$$\text{Organ weight (grams/kg live body weight)} = \frac{\text{Weight of organ (g)}}{\text{Live weight before slaughter (g)}} \times 100$$

## Result and Discussion

### Heart weight

The weight of the heart was statistically non-significant ( $P > 0.05$ ) among all the treatment groups compared to the control group. The heart weight (g/100g body weight) in different treatment groups were 0.578 (T1), 0.576 (T2), 0.581 (T3), 0.588 (T4) and 0.596 (T5).

### Liver weight

The liver weight (g/100g body weight) in different treatment groups were 2.38 (T1), 2.48 (T2), 2.36 (T3), 2.40 (T4) and 2.57 (T5) and there was no significant difference ( $P \geq 0.05$ ) in the liver weight among all the groups compared to control group.

### Gizzard weight

There was no significant difference ( $P \geq 0.05$ ) in the gizzard weight among all the groups compared to the control group. The gizzard weight (g/100g body weight) in different treatment groups were 2.52 (T1), 2.54 (T2), 2.61 (T3), 2.65 (T4) and 2.58 (T5).

### Proventriculus weight

The proventriculus weight (g/100g body weight) in different treatment groups were 0.671 (T1), 0.664 (T2), 0.679 (T3), 0.682 (T4) and 0.693 (T5) and there was no significant difference ( $P \geq 0.05$ ) in the proventriculus weight among all the groups compared to control group.

There was no significant difference ( $P > 0.05$ ) in the weight of liver, heart, gizzard and proventriculus in the groups fed with neem, ginger and garlic powder and their combination compared to the control group. The results are in agreement with the study in which maize was replaced with sundried neem leaf at the rate of 5, 10 and 15 per cent in the diet and observed no significant difference ( $P > 0.05$ ) in the carcass weight, hind limb, wing, breast and heart weight (Muhammad *et al.* 2018)<sup>[6]</sup>. Similar results are also obtained in the study in which the ginger waste meal at the rate of 10, 20, 30 and 40% replacing the maize and observed no significant difference ( $P > 0.05$ ) in the dressing percentage, liver, lung, kidney and heart weight which they attributed the reason to the lower energy density of the feed leading to no change in the carcass characteristics (Omage *et al.* 2007)<sup>[7]</sup>. The study is in disagreement with the study in which ginger and garlic oil was supplemented at the rate of 10, 20 and 30 mg/kg/day and observed significantly lowered ( $P \leq 0.05$ ) heart weight of broiler chicken on garlic essential oil compared to control which they attributed the reason to hypolipidemic and hypocholesterolemic properties of the garlic and ginger (Dieumou *et al.* 2018)<sup>[8]</sup>.

**Table 1:** Effect of feeding neem, ginger and garlic powder on visceral organ weight (g/100g body weight) of commercial layers

Experimental group	Description of the treatment	Visceral organ weight (g/100g body weight)			
		Heart	Liver	Gizzard	Proventriculus
T1	Control	0.578 ± 0.026	2.38 ± 0.067	2.52 ± 0.05	0.671 ± 0.014
T2	Control + garlic powder 0.5%	0.576 ± 0.044	2.48 ± 0.069	2.54 ± 0.13	0.664 ± 0.016
T3	Control + neem powder 0.5%	0.581 ± 0.021	2.36 ± 0.110	2.61 ± 0.073	0.679 ± 0.012
T4	Control + ginger powder 1%	0.588 ± 0.029	2.40 ± 0.097	2.65 ± 0.09	0.682 ± 0.009
T5	Control + garlic 0.5% + neem 0.5% + ginger powder 1%	0.596 ± 0.022	2.57 ± 0.075	2.58 ± 0.093	0.693 ± 0.015

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