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**THE EFFECT OF DIFFERENT LEVELS OF *NIGELLA SATIVA* AND *TRIGONELLA FOENUM-GRÆCUM* ON SOME BODY ORGANS OF BROILERS**

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**ABSTRACT**

In order to study of the effect of *Nigella sativa* and fenugreek seed on some body organs of broiler chickens Ross 308, an experiment was conducted with 648 one-day-old chicks. A 3×3 factorial arrangement was used including 3 levels of *Nigella sativa* (0, 0.5 and 1.0%) and 3 levels of *Trigonella foenum-graecum* (0, 0.5 and 1.0%). *Nigella sativa* level had not significant effect on pancreas, liver and bile, and hearth weight ( $P>0.05$ ), although *Nigella sativa* supplementation as much as 1.0% had the highest pancreas and hearth weight numerically. Also, *Trigonella foenum-graecum* level had not significant effect on pancreas, liver and bile, and hearth weight ( $P>0.05$ ), however *Trigonella foenum-graecum* supplementation as much as 0.5% had the highest pancreas, liver and bile, and hearth weight numerically. *Nigella sativa* level had significant effect on gizzard weight ( $P\leq 0.05$ ), so *Nigella sativa* supplementation as much as 1.0% had the highest gizzard weight significantly (73.14 g). Also, *Trigonella foenum-graecum* level had significant effect on gizzard weight ( $P\leq 0.05$ ), so *Trigonella foenum-graecum* supplementation as much as 1.0% had the highest gizzard weight significantly (79.08 g). The studied treatments had significant difference for pancreas and hearth weight ( $P\leq 0.05$ ), so *Nigella sativa* as much as 1.0% and *Trigonella foenum-graecum* as much as 0 and 0.5% had significantly the highest pancreas and hearth weight respectively.

**Keywords: Chick, *Nigella sativa*, Fenugreek, Hearth, Gizzard, Liver, Bile, Pancreas**

## INTRODUCTION

Previous studies confirmed effects of *Nigella sativa* on broiler performance [1, 2], intestinal morphology [3], blood indices and immunity [4] and carcass quality [5]. However there are few reports about its effects on broiler organs.

On the other hand, there are some reports about *in vitro* properties of *Trigonella foenum-graecum* [6] and its effects on visceral organs of broilers [7].

However there are few experiments for simultaneous comparison of *Nigella sativa* and *Trigonella foenum-graecum*. The objective of the present study was to investigate on comparison of the effects of *Nigella sativa* and *Trigonella foenum-graecum* on the some body organs in broiler chicks.

## MATERIALS AND METHODS

A total of 648 one-day-old male chicks of the Ross 308 strain were allotted to 36 groups (9 treatments and 4 replicates for each treatment) of 18 birds, such that mean group body weights were similar for each group. All rearing conditions including temperature, humidity, light, density, and health programs were similar in all groups and was based on standard protocols.

A 3×3 factorial arrangement with three *Nigella sativa* levels (0, 0.5 and 1.0%) and

three *Trigonella foenum-graecum* levels (0, 0.5 and 1.0%) used in order to evaluation of their effects on broiler organs.

Therefore, the studied treatments were as follows:

T1) *Nigella sativa* (0%)- *Trigonella foenum-graecum* (0%);

T2) *Nigella sativa* (0%) - *Trigonella foenum-graecum* (0.5%);

T3) *Nigella sativa* (0%) - *Trigonella foenum-graecum* (1.0%);

T4) *Nigella sativa* (0.5%) - *Trigonella foenum-graecum* (0%);

T5) *Nigella sativa* (0.5%) - *Trigonella foenum-graecum* (0.5%);

T6) *Nigella sativa* (0.5%) - *Trigonella foenum-graecum* (1.0%);

T7) *Nigella sativa* (1.0%) - *Trigonella foenum-graecum* (0%);

T8) *Nigella sativa* (1.0%) - *Trigonella foenum-graecum* (0.5%); and

T9) *Nigella sativa* (1.0%) - *Trigonella foenum-graecum* (1.0%)

A two phase feeding program was used in this investigation and consisted of provision of starter feed from 1st-21st days of age, and grower feed from 22nd-42nd days of age. The ingredient and nutrient composition of diets are shown in **Tables 1 and 2** respectively. The diets met or exceeded Ross 308 catalogue recommendations.

Data were analyzed by analysis of variance using a 3×3 factorial arrangement with 3 *Nigella sativa* levels (0, 0.5 and 1.0%) and 3 *Trigonella foenum-graecum* levels (0, 0.5 and 1.0%) using a two-way ANOVA procedure and based on  $Y_{ijk} = \mu + A_i + B_j + AB_{ij} + e_{ijk}$  formula. The Duncan post hoc test was used if the initial test result was significant at  $P \leq 0.05$ . Statements of significance were based on  $P \leq 0.05$ .

## RESULTS AND DISCUSSION

Obtained results are summarized in **Table 3**. From obtained results, it is showed that *Nigella sativa* level had not significant effect on pancreas weight ( $P > 0.05$ ), although *Nigella sativa* supplementation as much as 1.0% had the highest pancreas weight numerically (5.77 g). Also, *Trigonella foenum-graecum* level had not significant effect on pancreas weight ( $P > 0.05$ ), however *Trigonella foenum-graecum* supplementation as much as 0.5% had the highest pancreas weight numerically (5.57 g). Nine studied treatments had significant difference for pancreas weight ( $P \leq 0.05$ ), so *Nigella sativa* as much as 1.0% and *Trigonella foenum-graecum* as much as 0% had the highest pancreas weight significantly (6.37 g).

*Nigella sativa* level had not significant effect on liver and bile weight ( $P > 0.05$ ), although

*Nigella sativa* supplementation as much as 0.5% had the highest liver and bile weight numerically (57.47 g). Also, *Trigonella foenum-graecum* level had not significant effect on liver and bile weight ( $P > 0.05$ ), however *Trigonella foenum-graecum* supplementation as much as 0.5% had the highest liver and bile weight numerically (57.25 g). Nine studied treatments had not significant difference for liver and bile weight ( $P > 0.05$ ), however *Nigella sativa* as much as 0.5% and *Trigonella foenum-graecum* as much as 1.0% had the highest liver and bile weight numerically (62.22 g). *Nigella sativa* level had not significant effect on hearth weight ( $P > 0.05$ ), although *Nigella sativa* supplementation as much as 1.0% had the highest hearth weight numerically (12.56 g). Also, *Trigonella foenum-graecum* level had not significant effect on hearth weight ( $P > 0.05$ ), however *Trigonella foenum-graecum* supplementation as much as 0.5% had the highest hearth weight numerically (12.86 g). Nine studied treatments had significant difference for hearth weight ( $P \leq 0.05$ ), so *Nigella sativa* as much as 1.0% and *Trigonella foenum-graecum* as much as 0.5% had the highest hearth weight significantly (14.25 g).

*Nigella sativa* level had significant effect on gizzard weight ( $P \leq 0.05$ ), so *Nigella sativa*

supplementation as much as 1.0% had the highest gizzard weight significantly (73.14 g). Also, *Trigonella foenum-graecum* level had significant effect on gizzard weight ( $P \leq 0.05$ ), so *Trigonella foenum-graecum* supplementation as much as 1.0% had the highest gizzard weight significantly (79.08 g). Nine studied treatments had not significant difference for gizzard weight ( $P > 0.05$ ), however *Nigella sativa* as much as 1.0% and *Trigonella foenum-graecum* as much as 1.0% had the highest gizzard weight numerically (78.50 g).

Previous studies on effects of *Nigella sativa* on broiler productivity [8, 9, 10] confirmed its positive/negative effects. Present study confirm positive effects of *Nigella sativa* on pancreas, liver and bile, hearth and gizzard. Meanwhile there are some reports about effects of *Trigonella foenum-graecum* on broilers [11, 12]. Our findings showed positive effects of *Trigonella foenum-graecum* on pancreas, liver and bile, hearth and gizzard. However it is need more experiments for careful investigation on simultaneous effects of *Nigella sativa* and *Trigonella foenum-graecum* on all aspects of broiler rearing including performance, carcass quality and quantity, economical aspects, immunity, hematological indices, intestinal microflora.

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Table 1: Feed ingredients of used diets during the starter (1st-21st days of age), and grower (22nd-42nd days of age) periods

Ingredient (%)	Starter period (1st-21st days of age)	Finisher period (22nd-42nd days of age)
Corn	57.75	59.00
Soybean Meal	34.75	32.70
Corn oil	3.50	3.50
Ca%22P%18	2.00	1.50
CaCO3	0.00	1.30
Zeolite	1.00	1.00
NaCl	0.20	0.20
DL-Methionine	0.15	0.15
Lysine-Hydro-Chloride	0.15	0.15
Vitamin premix*	0.25	0.25
Mineral premix**	0.25	0.25
Total	100	100

\*Calcium Pantothenate: 4 mg/g; Niacin: 15 mg/g; Vitamin B6: 13 mg/g; Cu: 3 mg/g; Zn: 15 mg/g; Mn: 20 mg/g; Fe: 10 mg/g; K: 0.3 mg/g

\*\*Vitamin A: 5000 IU/g; Vitamin D3: 500 IU/g; Vitamin E: 3 mg/g; Vitamin K3: 1.5 mg/g; Vitamin B2: 1 mg/g

Table 2: Nutrient analysis of used diets during the starter (1st-21st days of age), and grower (22nd-42nd days of age) periods

Nutrient analysis*	Starter period (1st-21st days of age)	Finisher period (22nd-42nd days of age)
Energy (kcal/kg)	3019.80	2995
Crude protein (%)	20.48	19.39
Calcium (%)	1.0	0.85
Available Phosphorus (%)	0.50	0.42
DCAB (mEq/kg)	236	202
Lysine (%)	1.15	0.96
Methionine (%)	0.50	0.48
Methionine + Cysteine (%)	0.83	0.78

\*Calculated nutrients

Table 3. Mean ( $\pm$ SEM) of body organs at 42nd days of age in Ross 308 broilers affected by the three different amounts of *Nigella sativa* and *Trigonella foenum-graecum*\*

Trait		Pancreas weight (gr)	Liver and bile weight (gr)	Hearth weight (gr)	Gizzard weight (gr)
Treatment					
<i>Nigella sativa</i> (%)	0	5.52 <sup>a</sup>	55.32 <sup>a</sup>	12.02 <sup>a</sup>	65.86 <sup>b</sup>
	0.5	5.08 <sup>a</sup>	57.47 <sup>a</sup>	12.47 <sup>a</sup>	68.14 <sup>ab</sup>
	1.0	5.77 <sup>a</sup>	55.57 <sup>a</sup>	12.56 <sup>a</sup>	73.14 <sup>a</sup>
SEM (Standard Error of Mean)		0.23	2.30	0.44	2.93
<i>Trigonella foenum-graecum</i> (%)	0	5.31 <sup>a</sup>	56.18 <sup>a</sup>	12.04 <sup>a</sup>	65.77 <sup>b</sup>
	0.5	5.57 <sup>a</sup>	57.25 <sup>a</sup>	12.86 <sup>a</sup>	69.29 <sup>ab</sup>
	1.0	5.50 <sup>a</sup>	54.93 <sup>a</sup>	12.30 <sup>a</sup>	79.08 <sup>a</sup>
SEM (Standard Error of Mean)		0.23	2.30	0.44	2.93
<i>Nigella sativa</i> (0%) - <i>Trigonella foenum-graecum</i> (0%)		4.77 <sup>b</sup>	53.34 <sup>a</sup>	11.11 <sup>b</sup>	61.32 <sup>a</sup>
<i>Nigella sativa</i> (0%) - <i>Trigonella foenum-graecum</i> (0.5%)		5.77 <sup>ab</sup>	62.07 <sup>a</sup>	12.00 <sup>ab</sup>	71.11 <sup>a</sup>
<i>Nigella sativa</i> (0%) - <i>Trigonella foenum-graecum</i> (1.0%)		6.03 <sup>ab</sup>	50.57 <sup>a</sup>	12.96 <sup>ab</sup>	65.16 <sup>a</sup>
<i>Nigella sativa</i> (0.5%) - <i>Trigonella foenum-graecum</i> (0%)		4.78 <sup>b</sup>	57.45 <sup>a</sup>	12.23 <sup>ab</sup>	66.63 <sup>a</sup>
<i>Nigella sativa</i> (0.5%) - <i>Trigonella foenum-graecum</i> (0.5%)		5.10 <sup>ab</sup>	52.74 <sup>a</sup>	12.42 <sup>ab</sup>	65.19 <sup>a</sup>
<i>Nigella sativa</i> (0.5%) - <i>Trigonella foenum-graecum</i> (1.0%)		5.37 <sup>ab</sup>	62.22 <sup>a</sup>	12.75 <sup>ab</sup>	72.60 <sup>a</sup>
<i>Nigella sativa</i> (1.0%) - <i>Trigonella foenum-graecum</i> (0%)		6.37 <sup>a</sup>	57.74 <sup>a</sup>	12.78 <sup>ab</sup>	69.36 <sup>a</sup>
<i>Nigella sativa</i> (1.0%) - <i>Trigonella foenum-graecum</i> (0.5%)		5.85 <sup>ab</sup>	56.96 <sup>a</sup>	14.25 <sup>a</sup>	71.56 <sup>a</sup>
<i>Nigella sativa</i> (1.0%) - <i>Trigonella foenum-graecum</i> (1.0%)		5.09 <sup>ab</sup>	52.01 <sup>a</sup>	10.67 <sup>b</sup>	78.50 <sup>a</sup>
SEM (Standard Error of Mean)		0.41	3.99	0.77	5.07

\* Means ( $\pm$  standard error of means) within each column of dietary treatments with no common superscript differ significantly at P<0.05.