



Effect of Supplementation of Different Levels of Rosemary Leaf Powder and Black Cumin Seed Powder alone or in Combination on the Broilers Carcass Parameters

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ABSTRACT

This study was undertaken to evaluate the carcass parameters of the Broiler chicks when fed with varying levels of the Rosemary leaf powder and Black Cumin seed powder in different treatment groups. The Broiler chicks were divided into ten dietary treatments groups and each dietary group was replicated to three sub-groups for uniform distribution. The T₁, *i.e.* control group was fed on basal diet, while T₂, T₃ and T₄ treatment groups were supplemented with 0.50%, 1.00% and 1.50%, of Rosemary in the basal Broiler starter and finisher ration, respectively. The T₅, T₆ and T₇ groups were supplemented with 0.50%, 1.00% and 1.50% of Black Cumin in the basal Broiler starter and finisher ration. The T₈, T₉ and T₁₀ treatment groups were supplemented with 0.25%, 0.50% and 0.75% in combination with Rosemary and Black Cumin in the basal Broiler starter and finisher ration, respectively. There highly significant effect was observed on dressing weight per cent, eviscerated weight per cent, while non-significant effect was observed on abdominal fat per cent, liver weight per cent, heart weight per cent, gizzard weight per cent, giblet per cent, blood loss per cent and feather loss per cent due to supplementation of rosemary and black cumin in diet of broilers. It can be inferred that supplementation of Black Cumin 1.00% alone and in combination 0.75 % of both herbs is quite effective and could be viable proposition for lucrative Broiler farming for carcass status.

HIGHLIGHTS

- Significant effect on dressing weight per cent, eviscerated weight per cent.
- Black cumin at 1% alone and in combination with 0.75% of both herbs is quite effective.

Keywords: Rosemary leaf powder, Black Cumin seed powder, Carcass parameters, Broiler chick

India has made tremendous progress in broiler production during the last three decades. The total poultry population in the country was 851.81 million in the year 2019, increased by 16.81 per cent over previous census of 2012. The India has exported 2,55,686.92 MT of poultry products to the world for the worth of ₹ 435.53 Crores/ 58.70 USD millions during the year 2020-21 (APEDA, 2021). Feed antibiotics have been banned and thus removed from diets in many countries. In such circumstances, feed industry will have to search for alternatives to the antibacterial feed additives (Khan *et al.*, 2011). Phyto-genic feed additives have received considerable attention as alternatives to

traditional antibacterial feed additives such as antibiotics, probiotics, and prebiotics. The main objective of adding feed additive is to boost performance by improving carcass characteristics, better feed conversion efficiency, greater livability, and lowered mortality in poultry birds.

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MATERIALS AND METHODS

Experimental design

In order to determine the effect of Rosemary leaf powder and Black Cumin seed powder as feed additives alone or in combination on carcass parameters of broilers. The completely randomized design was adopted for the experimental trial. The 360, day old broiler chicks were equally and randomly divided into ten dietary treatments groups (T₁-T₁₀) and each dietary group was replicated to three sub-groups (R₁-R₃) to make sure uniformity in initial body weight and non-significant in various treatment groups. Each dietary group consists of 36 chicks distributed into 3 replicated pens of 12 chicks each.

Carcass parameter

The selected birds were weighed individually and allowed to fast for 12 hour to empty gut contents before sacrifice. One representative bird from each replicate was sacrificed for carcass study at the end of 6th week. Selected birds had live weight similar to the mean live weight of the population concerned

Dressed weight (%)

The birds were weighed immediately before slaughtering. The slaughtering was done by severing the jugular vein and 5 minutes bleeding time was allowed for each bird. The dressed weight was expressed as percent of live weight. Dressed weight was calculated as:

Dressed weight (%) =

$$\frac{\text{Live wt. (g)} - \text{Wt. of blood, feather, shank and head (g)}}{\text{Live wt. (g)}}$$

Eviscerated weight (%)

The dressed birds were eviscerated by giving a median cut in the abdomen and removing the crop, gullet, trachea and viscera. The lungs were scrapped off. Heart, liver, pancreas, spleen and gizzard were separated from GI tract. The giblets (heart, liver and gizzard) were cleaned

and retained along with the carcass to record eviscerated weight and expressed as percentage of pre-slaughter weight.

$$\text{Eviscerated weight} = \frac{\text{Eviscerated weight (g)}}{\text{Live wt. (g)}}$$

Weight of different organs and offals

From the sacrificed birds, giblet (heart, liver and gizzard), immune organs (spleen, bursa and thymus) and abdominal fat were separated carefully and weighed with the help of electronic balance to observe the effect of different dietary treatments on growth and development of certain organs. The weight of immune organs viz. spleen, bursa and thymus from each sacrificed bird was recorded and expressed as the percent of pre-slaughter bird weight (g/100g). The weight of the fat in the abdomen including the fat surrounding gizzard, bursa, cloaca and adjacent muscles of each sacrificed bird was recorded and expressed as the percent of preslaughter bird weight. The feathers were removed completely by hand picking leaving the skin intact and expressed as the percent of pre-slaughter bird weight. The weight of blood lost was also recorded.

$$\text{Percent weight of giblet} = \frac{\text{Giblet weight (g)}}{\text{Live wt. (g)}} \times 100$$

$$\text{Percent weight of heart} = \frac{\text{Heart weight (g)}}{\text{Live wt. (g)}} \times 100$$

$$\text{Percent weight of liver} = \frac{\text{Liver weight (g)}}{\text{Live wt. (g)}} \times 100$$

$$\text{Percent weight of gizzard} = \frac{\text{Gizzard weight (g)}}{\text{Live wt. (g)}} \times 100$$

The birds were weighed immediately before slaughtering. The dressed weight was expressed as percent of live weight. The giblets were cleaned and retained along with the carcass to record eviscerated weight and expressed as percentage of pre-slaughter weight. From the sacrificed birds, giblet, and abdominal fat were separated carefully and weighed with the help of electronic balance to observe the effect of different dietary treatments on growth and development of certain organs. The weight of the fat in the abdomen including the fat surrounding gizzard, bursa,

cloaca, and adjacent muscles of each sacrificed bird was recorded and expressed as the percent of pre slaughter bird weight. The feathers were removed completely by hand picking leaving the skin intact and expressed as the percent of pre slaughter bird weight. The weight of blood lost was also recorded.

RESULTS AND DISCUSSION

The overall mean values of dressing yield (%) and eviscerated yield (%) were found between 73.78 to 76.66 and 60.89 to 64.46, respectively. The statistical analysis of data of dressing yield per cent revealed significant improvement ($P < 0.01$) in supplemented groups as compared to control. The dressing yield in T_2 , T_5 , T_6 , T_7 and T_8 groups were statistically similar and significantly higher than non-supplemented broiler group. The data of eviscerated yield (%) showed significant ($P < 0.01$) improvement in supplemented groups as compared to control. Significantly higher yield was observed for T_6 and T_{10} groups which was also comparable with T_2 , T_5 and T_9 groups. The result obtain in present study are in agreement with the finding of Yesilbag *et al.* (2011), reported significant ($P < 0.05$) affected carcass yield due to supplementation of rosemary in broiler diet. Meena (2015) also reported significant affected eviscerated weight due to supplementation of rosemary leaf powder in broilers diet, however, Soltani *et al.* (2016) observed significant

lower carcass yield than control due to supplementation of different level of rosemary powder. Guler *et al.* (2006) reported significant affected carcass yield due to supplementation of black cumin seed in broilers diet. Al-Hothaify and Al-Sanabani (2016) also reported significant increase in dressing percent due supplementation of black cumin seed powder in the diet, however, Shewita and Taha (2011) and Singh and Kumar (2017) reported non-significant effect due to supplementation of black cumin seed powder on carcass yield in broilers.

Giblet and Offals Yield

The overall mean values of abdominal fat, liver weight, heart weight, gizzard weight, and giblet weight (%) were found between 1.44 to 1.77, 1.71 to 2.57, 0.42 to 0.47, 2.11 to 2.45 and 4.65 to 5.41, respectively. The statistical analysis of data of abdominal fat, abdominal fat, liver weight, heart weight, gizzard weight, and giblet weight (%) revealed no significant effect ($P > 0.05$) among broilers fed with or without herbal feed additives. Data regarding blood loss and feather loss (%) weight showed similar trend as above revealing no effect ($P > 0.05$) of rosemary leaf powder and black cumin seed powder supplementation in broilers of different groups. The value of blood loss and feather loss (%) weight ranged between 2.24 to 2.52 and 4.22 to 4.85, respectively. The current findings are in accordance with those of Ghazalah and Ali (2008), who

Table 1: Effect of supplementation of rosemary leaf powder and black cumin seed powder on carcass evaluation parameters (% of Live Weight)

Treatment groups	Dressing Yield	Eviscerated Yield	Abdominal Fat	Liver	Heart	Gizzard	Giblet	Blood-Loss	Feather Loss
T_1	73.78 ^a	60.89 ^a	1.77	2.01	0.47	2.18	4.65	2.24	4.85
T_2	76.48 ^c	64.16 ^{cd}	1.67	2.44	0.46	2.21	5.28	2.41	4.36
T_3	74.36 ^b	62.43 ^b	1.71	2.39	0.46	2.18	5.02	2.25	4.43
T_4	74.04 ^{ab}	61.99 ^b	1.71	1.71	0.45	2.19	5.07	2.37	4.4
T_5	76.38 ^c	63.96 ^{cd}	1.72	2.37	0.46	2.11	4.93	2.3	4.47
T_6	76.66 ^c	64.46 ^d	1.44	2.66	0.42	2.32	5.41	2.55	4.22
T_7	76.37 ^c	63.45 ^c	1.61	2.3	0.43	2.18	4.89	2.38	4.39
T_8	76.2 ^c	63.48 ^c	1.66	2.4	0.44	2.45	4.37	2.37	4.37
T_9	74.33 ^{ab}	63.98 ^{cd}	1.69	2.44	0.43	2.25	5.11	2.41	4.39
T_{10}	74.51 ^b	64.28 ^d	1.63	2.57	0.44	2.19	5.18	2.52	4.25
SEM	0.179	0.228	0.058	0.266	0.011	0.242	0.338	0.186	0.121

Note: The means with different superscripts in a column differ significantly from each other ($P < 0.01$).



Fig. 1



Fig. 2

reported no significant differences in carcass, liver, heart and abdominal fat percentages of chicks fed different concentrations of rosemary leaf meal compared to the control groups. No differences ($P>0.05$) in the relative weight of breast muscles, liver, gizzard, heart, edible offal, and abdominal fat were noticed due to supplementation of *Rosmarinus officinalis* and *Ribes nigrum* in broiler diet (Sierzant *et al.*, 2021). Similar to present results, carcass traits like dressing yield, giblet weight, cooking loss, pH, share force were also remain unaffected ($P>0.05$) by the dietary treatment groups containing black cumin (Singh and Kumar, 2017). Meanwhile, Jahan *et al.* (2015) reported that there was no significant difference for the average body weight, dressing yield, thigh meat, wing meat, heart, gizzard and liver weight due to supplementation of black cumin in the diet of broilers. In contrast to present findings supplementation with black cumin seed increased slaughter weight, thigh weight, breast weight, edible internal organs and abdominal fat in many studies (Guler *et al.*, 2006; Ashayerizadeh *et al.*, 2009; Erener *et al.*, 2010; Saleh, 2014; Kumar *et al.*, 2017b) The increase in dressed yield of broiler in rosemary and black cumin supplemented group require quantification of increased meat yield for better profitability and the non-significant results on giblet and offals yield percent were within normal weight range indicating no adverse effect on the internal organ upon inclusion of phytogetic feed additives

in broilers diet. At the end, it could be concluded that supplementation of black cumin (1.00%) and rosemary and black cumin combination (0.75% each) indicates their prospective to use as feed additive in broiler ration for better performance and carcass tracts.

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