



Original Research

Effect of Dietary Supplementation of Tulsi (*Ocimum sanctum*) and Fenugreek (*Trigonella foenum-graceum* L.) on Carcass Characteristics of Heat Stressed Broilers in Arid Zone

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Abstract

A study was carried out to evaluate the effect of dietary supplementation of Tulsi (*Ocimum sanctum*) leaf powder and fenugreek (*Trigonella foenum-graecum* L.) seed powder as herbal feed additives on carcass characteristics of heat stressed broilers at poultry farm, College of Veterinary and Animal Science, Bikaner. A total of two hundred and ten day-old broiler chicks of Cobb-400 strain were used in the experimental study of six weeks duration. They were divided into seven treatment groups with three replicates of ten chicks in each replicate. The control group (C) was fed on basal diet without any supplementation and other six treatment groups were supplemented with 0.5% tulsi leaf powder, 1% tulsi leaf powder, 0.5% fenugreek seed powder, 1% fenugreek seed powder, 0.25% tulsi leaf powder + 0.25% fenugreek seed powder and 0.5% tulsi leaf powder + 0.5% fenugreek seed powder and designated as T₁, T₂, F₁, F₂, T₁F₁ and T₂F₂ groups, respectively. Statistical analysis of data revealed highly significant ($P < 0.01$) effect of tulsi and fenugreek supplementation alone or in combination on dressing percent and non-significant effect on eviscerated percent, and on per cent liver weight, heart weight, gizzard weight and giblet weight. The highest dressing percent was found in T₁ followed by F₁, T₁F₁, F₂, T₂, T₂F₂, and Control.

Key words: Broiler, Dressing Weight, Eviscerated Weight, Fenugreek, Tulsi

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Introduction

Broiler production the most fast growing section of the poultry industry in the country and poultry industry has evolved as agro based industry in India. Poultry today not only acts as income stabilizer but also provides regular and timely income as compared to other livestock farming. The economics of poultry industry depends upon the feed. Over a long period, extensive efforts have been made to reduce the cost of



production by reducing the expenses on feed. Feed additives are one of the important tools used for improving feed conversion ratio, growth rate and disease resistance. Lots of herbal preparations help the birds to fight stress arising due to various reasons. Adaptogenic herbs like ashwagandha, tulsi, amla, ginseng etc. are being used as anti-stress factors for long years in human and animal medicines with proven results (Ranade and Desai, 2005).

The *Ocimum sanctum* "Tulsi" in Sanskrit means "the incomparable one". Whole plant is used as a source of remedy. Various studies have been performed with *Ocimum sanctum* (Tulsi) for its antibacterial, antioxidant, antiulceric, antimalarial, antidiabetic, anti-inflammatory, antilipidemic, anticancer and immunomodulatory properties. Fenugreek (*Trigonella foenum-graecum L.*), locally known as Methi, is a well-known medicinal plant that grows in nature and mainly cultivated in India, Pakistan and China (Alloui *et al.*, 2012). Fenugreek leaves and seeds have been used extensively to prepare extracts and powders for medicinal uses (Basch *et al.*, 2003). It is reported to have anti-diabetic, anti-fertility, anti-cancer, anti-microbial, antiparasitic hypo-cholesterolaemic effects (Al-Habori and Roman, 2002), hypoglycemic, anthelmintic, antibacterial, anti-inflammatory and antipyretic properties (Ahmadiani *et al.*, 2001; Basch *et al.*, 2003).

Materials and Methods

A total of two hundred and ten, day old broiler chicks of Cobb-400 strain were divided into seven treatment groups with 3 replicates of 10 chicks in each replication using completely randomized design. All experimental chicks were randomly assigned to 21 pens and identified with wing bands. Experiment was conducted for six weeks duration in extreme environmental heat condition in month of May and June at arid zone of Rajasthan. Environmental stress was noticed as ambient temperature and THI were recorded to be higher than the threshold. The control group (C) was fed with basal diet without any supplementation diet and treatment groups T₁ and T₂ were supplemented with 0.5% and 1% level of Tulsi leaf powder in the experimental broiler starter and finisher ration, respectively. Likewise F₁ and F₂ treatment groups were supplemented with 0.5% and 1% level of Fenugreek seed powder in the experimental broiler starter and finisher ration, respectively. T₁F₁ and T₂F₂ treatment groups were supplemented with 0.5% and 1% level of both Tulsi leaf powder and Fenugreek seed powder in combination, respectively. The birds were fed as per recommendation of BIS (1992) feeding standards to meet the energy and protein requirements during starter phase (0-28 days) and finisher phase (29-42 days). To study the effect of different treatments on carcass traits *viz.*, dressed weight percentage, eviscerated weight percentage, weight of giblet and organometry, two representative birds from each replicate were 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.

a) Dressed Weight (Per cent)

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. Dressed weight was calculated as-

$$\text{Dressed wt. (\%)} = \frac{\text{Live wt.} - \text{Wt. of blood, feather, shank and head}}{\text{Live wt.}} \times 100$$

b) Eviscerated Weight (per cent)

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.

$$\text{Eviscerated weight (\%)} = \frac{\text{Dressed weight} - \text{weight of visceral organ}}{\text{Live wt.}} \times 100$$

c) Liver Weight (Per cent)

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

d) Heart Weight (Per cent)

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

e) Gizzard Weight (Per cent)

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

f) Giblet Weight (Per cent)

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

Statistical Analysis

Data collected during the present investigation were subjected to statistical analysis by adopting appropriate methods of analysis of variance as described by Snedecor and Cochran (1994). Wherever, the variance ratio (F-values) were checked for significance at 5 per cent and 1 per cent levels of probability, the significance of mean differences were tested by Duncan's New Multiple Range Test (Duncan's Range Test) as modified by Kramer (Kramer 1956).

Result and Discussion

The per cent means of dressed weight and eviscerated weight for various treatment groups were recorded to be 71.57% and 62.37% in C, 76.35% and 68.81% in T₁, 73.30% and 64.75% in T₂, 76.00% and 68.48% in F₁, 73.43% and 64.25% in F₂, 75.65% and 67.96% in T₁F₁, 73.22% and 64.65% in T₂F₂, respectively (Table 1). The statistical analysis of data revealed highly ($P < 0.01$) significant effect of supplementation of Tulsi (*Ocimum sanctum*) and Fenugreek (*Trigonella foenum-graecum* L.) alone and in combination on dressed weight but non-significant on eviscerated weight.

Table 1: Carcass characteristics of broilers birds in different dietary treatments

Parameter	C	T ₁	T ₂	F ₁	F ₂	T ₁ F ₁	T ₂ F ₂	SEM
Dressing weight %	71.57 ^a	76.35 ^c	73.30 ^b	76.00 ^c	73.43 ^b	75.65 ^c	73.22 ^b	0.3398
Eviscerated weight %	62.37	68.81	64.75	68.48	64.25	67.96	64.65	0.343
Liver weight %	2.02	2.06	2.1	2.01	2.04	2.04	2.16	0.0701
Heart weight %	0.4	0.38	0.36	0.37	0.36	0.36	0.38	0.0101
Gizzard weight %	2.11	2.21	2.17	2.2	2.14	2.15	2.2	0.0467
Giblet weight %	4.53	4.65	4.63	4.58	4.54	4.55	4.74	0.126

Means bearing different superscripts (a, b, c, d) in a row differ significantly ($P < 0.01$)

On observing the data highest dressed weight was recorded in T₁ followed by F₁, T₁F₁, F₂, T₂, T₂F₂ and C. These results obtained in study are comparable with the findings of Alloui *et al.* (2012), Momoun (2014) and Meena (2015) recorded similar findings upon inclusion of phytochemicals or herbs as feed additive in the ration of broilers. Highest eviscerated weight was recorded in T₁, which was comparable with F₁ and T₁F₁ and lowest eviscerated weight was recorded for C, i.e. control. The improved dressed weight in herb supplemented groups is may be due to antistress and antioxidative property of herbs. The per cent liver weight, heart weight, gizzard weight and giblet weight was found to be 2.02, 0.40, 2.11, 4.53 %, respectively in Control, 2.06, 0.38, 2.21, 4.65 %, respectively in T₁, 2.10, 0.36, 2.17, 4.63 %, respectively in T₂, 2.01, 0.37, 2.20, 4.58 %, respectively in F₁, 2.04, 0.36, 2.14, 4.54 %, respectively in F₂, 2.04, 0.36, 2.15, 4.55%, respectively in T₁F₁, 2.16, 0.38, 2.20, 4.74%, respectively in T₂F₂. The statistical analysis of data revealed non-significant effect of supplementation of Tulsi (*Ocimum sanctum*) and Fenugreek (*Trigonella foenum-graecum* L.) alone and in combination on per cent liver weight, heart weight, gizzard weight and giblet weight. The results of study in text corroborate well with findings of Khatun *et al.* (2013) who reported non-significant effect of Tulsi leaves extract supplementation on relative liver weight, heart weight and gizzard weight. The results also get support from the findings of Abbas (2010) who also reported non-significant effect of supplementation of tulsi and fenugreek in broiler ration on per cent liver weight, heart weight, gizzard weight and giblet weight.



Conclusion

Considering the carcass characteristics of broilers, it seems that tulsi leaf powder and fenugreek seed powder supplementation @ 0.5% each for intensive broiler production improves the dressing weight percent with improved eviscerated weight per cent. However, supplementation of tulsi leaf powder and fenugreek seed powder alone and also in combination has no significant impact on organometry in broilers.

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