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Effect of dietary supplementation of garlic (*Allium sativum*) on carcass characteristics of Kadaknath layer birds in arid zone

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Abstract

The aim of this study was to determine the optimum level of supplementation of Garlic (*Allium sativum*) powder in the ration of Kadaknath layers and to assess the effect of supplementation of Garlic (*Allium sativum*) powder as feed additive on performance of Kadaknath layers. A feeding trial of twelve weeks using 150 birds of 39 weeks old Kadaknath layers was conducted followed by five days metabolic trial. The birds were divided into five treatments having three replicates in each group with 10 birds in each replicate. The treatment T₁ i.e. control group fed on unsupplemented diet and T₂, T₃, T₄, T₅ supplemented with 0.5%, 1%, 1.5% and 2% level, of Garlic powder along with basal diet, respectively. The results of present study revealed no significant effect of Garlic supplementation in all carcass characteristics with no detrimental effect on layers.

Keywords: Carcass characteristics, dressed weight, eviscerated weight, garlic, Kadaknath layers

Introduction

The Kadaknath is important native chicken breed in India. Kadaknath breed, also known as Kalamashi in Hindi, is known for its black-coloured meat. It is being reared by tribal communities in its breeding tract of the Jhabua and Dhar districts in the western region of the state of Madhya Pradesh and in adjoining areas of the states of Gujarat and Rajasthan. It is found in various studies that the Kadaknath chicken eggs have good nutritive value and has also been believed to treat headaches, post-delivery problems, asthma and nephritis. It contains vitamins, protein, fat, calcium, phosphorus, iron, nicotinic acid and many amino acids. Use of herbal feed additive is gaining importance in animal production due to ban on use of antibiotics due to harmful residual effects and cost effectiveness. Probiotics, prebiotics, enzymes, organic acids, minerals as well as herbs can be seen as alternatives to antibiotic feed additives (Sharma *et al.*, 2009). Garlic has several anti-parasitic, anti-viral, anti-bacterial and anti-fungal properties (Puvaca *et al.*, 2014) [6] and has been used traditionally for treating respiratory infections, ulcers, diarrhoea and skin infections (Fenwick and Hanley, 1985) [2]. Dietary supplementation of Garlic (*Allium sativum*) was reported to enhance laying performance and reduction in egg yolk cholesterol in laying hens (Khan *et al.*, 2007; Toghiani *et al.*, 2011) [4, 8]. Keeping the aforesaid facts in view, the present investigation is being planned to find out the optimum level of incorporation of Garlic (*Allium sativum*) on Carcass Characteristics of Kadaknath Layer Birds in Arid Zone.

Materials and Methods

A total of 150 Kadaknath layers of 39 weeks of age were used in the experiment and birds were reared on deep litter at college poultry farm. The experimental layers were selected on body weight basis. The layers were divided randomly in completely randomized block design into five treatments with 30 birds in each treatment with three replicate. These groups were designated as T₁, T₂, T₃, T₄ and T₅. The T₁ i.e. control group was fed on basal diet only, while T₂, T₃, T₄ and T₅ treatment groups were supplemented with 0.50%, 1.00%, 1.50% and 2.00% of Garlic powder in the basal feed, respectively. The procured experimental layers were leg banded for identification. In the present investigation to study the effect of Garlic powder at various levels on carcass traits one bird per replicate was sacrificed after the end of experiment. The following carcass parameters were recorded in the investigation.

Carcass yield**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.

$$\text{Dressed weight (\%)} = \frac{\text{Dressed weight (g)}}{\text{Live weight (g)}} \times 100$$

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.

$$\text{Eviscerated weight (\%)} = \frac{\text{Eviscerated weight (g)}}{\text{Live weight (g)}} \times 100$$

Weight of different giblet and abdominal fat (%)

From the sacrificed birds, giblet (heart, liver and gizzard) 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.

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

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

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

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

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

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 (2004) [7]. Wherever, the variance ratio (F-values) were found significant at 5 per cent and 1 per cent levels of probability, the significance of mean differences was tested by Duncan's New Multiple Range Test (Duncan's Range Test) as modified by Kramer (Kramer 1956) [5].

Results and Discussion**Carcass yield (%)**

The per cent dressed weight (%) and percent eviscerated weight (%) of slaughtered birds observed in various treatment

groups have been presented in Table 1. The statistical analysis of data for various carcass characteristics revealed non-significant effect of supplementation of Garlic (*Allium sativum*) powder at different levels as feed additive in the ration of Kadaknath layers.

The comparison of means of per cent dressed weight revealed that T₃ has highest mean per cent dressed weight (77.59%) followed by T₅ (76.88%), T₄ (76.80%), T₂ (76.49%) and T₁ (76.20%). Numerically, T₁ had lowest dressed weight percent, whereas the mean per cent eviscerated weight was highest in T₅ (54.44%), followed by T₁ (53.62%), T₂ (53.50%), T₃ (52.95%) and T₄ (52.89%) groups, respectively. The result of present study corroborates well with findings of Elagib *et al.* (2013) [11] who also recorded no significant effect on dressing weight (%) due to supplementation of Garlic (*Allium sativum*) powder as feed additive in the diet of broilers.

Giblet, offals and abdominal fat

The data regarding per cent weights of giblet, heart, liver, gizzard and abdominal fat observed in various treatment groups have been presented in Table 1.

The mean per cent weight of giblet in T₁, T₂, T₃, T₄ and T₅ groups were calculated and found to be 3.65, 3.75, 3.65, 3.66 and 3.49 per cent, respectively. The statistical analysis of data revealed no significant effect of incorporation of Garlic (*Allium sativum*) powder at different levels as feed additive in the ration of Kadaknath layers on mean per cent weight of giblet. The highest mean per cent giblet weight was found in T₂ and lowest giblet per cent weight was found in T₅. The mean of per cent weight of heart was observed to be 0.50, 0.50, 0.54, 0.45 and 0.50 per cent in T₁, T₂, T₃, T₄ and T₅, respectively. The statistical analysis of data revealed no significant effect of supplementation of Garlic (*Allium sativum*) powder at different levels as feed additive in the ration of Kadaknath layers on per cent heart weight. Although highest and lowest heart weight per cent was recorded in T₃ and T₄ groups, respectively. The mean per cent weight of liver found to be 2.01, 2.07, 2.13, 2.41 and 2.06 per cent in T₁, T₂, T₃, T₄ and T₅ groups, respectively. The statistical analysis of data related to per cent liver weight shown in Table 1 revealed non-significant effect of Garlic (*Allium sativum*) powder at different levels as feed additive in the ration of Kadaknath layers. However, numerically highest and lowest mean liver weight per cent was found T₄ and control groups, respectively. The means of per cent weight of gizzard in T₁, T₂, T₃, T₄ and T₅ groups were calculated and it was found to be 0.99, 0.98, 0.97, 0.80 and 0.93 per cent, respectively. The statistical analysis of data related to gizzard per cent weight revealed no-significant effect of Garlic (*Allium sativum*) powder at different levels as feed additive in the ration of Kadaknath layers. Highest gizzard weight per cent was found in T₁, while lowest in T₄ group. The means of per cent weight of abdominal fat in T₁, T₂, T₃, T₄ and T₅ groups were observed to be 3.04, 3.23, 2.87, 2.77 and 2.76 per cent, respectively. The statistical analysis of data related to abdominal fat per cent revealed no significant effect of Garlic (*Allium sativum*) powder at different levels as feed additive in the ration of Kadaknath layers. Numerically highest abdominal fat per cent was found in T₂, while lowest in T₅ treatment group.

The results of present study corroborates well with findings of Issa *et al.* (2012) [3] who recorded non-significant effect on heart (%), liver (%), gizzard (%) and abdominal fat (%) due to supplementation of Garlic (*Allium sativum*) powder as feed additive in the diet of broilers.

Table 1: Carcass characteristics of Kadaknath layers in different dietary treatments

Parameter	T ₁	T ₂	T ₃	T ₄	T ₅	SEM
Dressing weight %	76.20	76.49	77.59	76.80	76.88	0.2564
Eviscerated weight %	53.62	53.50	52.95	52.89	54.44	0.8614
Heart %	0.50	0.50	0.54	0.45	0.50	0.0294
Liver %	2.01	2.07	2.13	2.41	2.06	0.0695
Gizzard %	0.99	0.98	0.97	0.80	0.93	0.0450
Giblet %	3.65	3.75	3.65	3.66	3.49	0.0930
Abdominal fat %	3.04	3.23	2.87	2.77	2.76	0.1300

Conclusion

These results of present investigation with Garlic powder in Kadaknath layers indicated the potential beneficial effects of Garlic by improving the dressing weight and eviscerated weight, and reducing the abdominal fat in Kadaknath layers. However, the effects were non significant but the present observations will provide the basis for future studies with clinical trials on mass level.

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