Volume : 4 | Issue : 4 | April 2015 • ISSN No 2277 - 8179

Research Paper

EFFECT OF FEEDING ASHWAGANDHA AND ENZYME ALONE ANDIN COMBINATION ON THE CARCASS TRAITS OF BROILER CHICKS

Veterinary Science

KEYWORDS : Ashwagandha, Enzyme, Carcass traits, Broiler Chicks

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ABSTRACT

A feeding trial of six weeks followed by metabolic trial was conducted, using Ashwagandha (Withania somnifera) at 0, 0.5, 1.0, 1.5 and 2.0 % levels, in 300 broiler chicks (cob-400 strain) randomly distributed in completely randomized block design. The experimental starter and finisher rations contained 3005.56 and 3180.02 k. cal energy and 23.10 and 20.15% CP, respectively. The five treatments were designated as T1 control group (without herb), T2 having 0.5% ashwagandha (Withania somnifera), T3 having 1.0% ashwagandha, T4 having 1.5% ashwagandha, and T5 having 2.0% ashwagandha. All the treatment groups were further subdivided in two sub groups namely E1 without enzyme mix supplementation and E2 with enzyme mix supplementation @ 0.05%. The carcass traits studied in terms of dressed weight and eviscerated weight revealed highly significant (P < 0.01) effect of Ashwagandha as feed additive. Enzyme supplementation in diet of broiler chicks though showed non-significant effect on dressed weight but significant (P < 0.05) effect was recorded on eviscerated weight. Concluded that the use of Ashwagandha as feed additive at optimum level of 1.0% is viable proposition to improve carcass traits of broiler chicken and its combination with enzyme supplementation could also be beneficial.

INTRODUCTION

Poultry meat is an important source of high quality proteins, minerals and vitamins to balance the human diet. Specially developed breeds of chicken meat (broiler) are now available with the ability of quick growth and high feed conversion efficiency. Depending on the farm size, broiler farming can be a main source of family income or can provide subsidiary income and gainful employment to farmers throughout the year. The advantages of broiler farming are small initial investment, short generation interval, quick assured and better returns, no need of trained manpower, high nutritive value of poultry meat, high fertilizer value of poultry manure and economic feasibility. The poultry has also the highest rate of growth in agricultural sector in India with a growth rate of 8-10% in eggs and 15- 20% in broilers over the last two decades. Today, India is world's fifth largest egg producer and eighteenth largest producer of broilers (Anonymous, 2012). Feed is a major component, affecting net return from the poultry business, because 70-75% of the total expenditure in terms of cash is spent on feed purchase. In the modern feeding practices, feed additives are assuming a position of prime importance in poultry nutrition.

The term feed additive is applied in a broad sense, to all products other than those commonly called feed stuffs, which could be added to the ration with the purpose of obtaining some special effects (Feltwell and Fox, 1979). Ashwagandha *(Withania somnifera)* isa plant of Solanaceae family. The plant has long brown tuberous roots that are used for medicinal purposes. Ashwagandha is reported to be general tonic, anti stress, hepato protective, haematinic, growth promoter, antioxidant in human practice (Bhattacharya and Ghosal, 1987) and anticoccidal agent in poultry practice (Das *et al.*, 2001). There is a significant effect of ashwagandha on body weight gain, feed consumption and feed conversion efficiency in different dietary treatments at six weeks of age in broilers (Akotkar *et al.*, 2007 and Sharma and Mamta, 2007). Along with ashwagandha, enzyme can be added to boost its effect on growth performance, meat quality, feed intake and digestibility in poultry diet.

The effect of different treatments on carcass traits (dressed weight and eviscerated weight) are recorded. Javed, *et al.,* (2009) noticed significantly higher dressing percentage, breast weight and leg weight in ashwagandha along with other herbs treated group. Similarly Srivastva, *et al.,* (2013) observed improvement in dressing percentage on account of ashwagandha supplementation. The positive effects of herbal supplements on carcass quality have been demonstrated by Tekeli *et al.,* (2006). The report of Alam *et al.,* (2003) concluded that enzyme treated groups exerts high dressing percentage in compare to control.Therefore, present study was undertaken to ascertain the effect of feeding ashwagandha and enzyme alone and in combination on the carcass traits of broiler chicks.

MATERIALS AND METHODS

The details of material used and methodology employed to conduct the experiment, recording of data related to the criteria fixed in the objectives of this study and statistical analysis employed for the present experiment are as follows:

Volume : 4 | Issue : 4 | April 2015 • ISSN No 2277 - 8179

Experimental chicks and their management

Three hundred day-old, unsexed, apparently healthy broiler chicks (Cob-400 strain) were used in the present experiment. Routine vaccination against Ranikhet Disease (F1 strain) and Infectious Bursal Disease was carried out on 7th and 14th day of procurement of day old chicks.All the chicks were wing banded, individually weighed and randomly divided into ten groups of 30 chicks each having almost similar average body weight. Each group of 30 chicks were reared in 30 separate, clean, disinfected deep litter brooder houses.Fresh and dry wheat straw was used as bedding material. Identical standard managemental practices regarding brooding, feeding, watering and disease control etc. were followed for each group during the course of study. The experiment was conducted in 5x2 factorial experimental design, broiler chicks were assigned randomly to various experimental groups (Table 1).

Table 1. Random distribution of broiler chicks in to experimental groups

Treatments		Enzyme	
(E1) Without enzyme mixture		(E2) With enzyme mixture (0.05%)	
T_1	Basal diet (control)	30	30
T_2	Basal Diet with 0.5% Ashwagandha	30	30
T_3	Basal Diet with 1.00% Ashwagandha	30	30
T_4	Basal Diet with 1.5% Ashwagandha	30	30
T_5	Basal Diet with 2.00% Ashwagandha	30	30

Composition of experimental ration and feeding

Commercial broiler starter and broiler finisher rations were used to provide balanced nutrients to all the broilers of different groups and feed additive such as ashwagandha *(Withaniasomnifera)*and enzyme were supplemented. The ashwagandha was supplemented @ 0.5, 1.0, 1.5 and 2.0% in the experimental broiler starter and finisher rations subjected to different treatment groups, and the treatment groups were designated as T1 (control), T2 (0.5%), T3 (1.0%), T4 (1.5%) and T5 (2.0%). Each treatment group was further subdivided into two sub groups designated as E_1 and E_2. In treatment group E_1 no supplementation of enzyme mixture was done, whereas, in E_2 broilers were subjected to supplementation of enzyme mixture at 0.05%. Ingredient wise compositions of experimental diets are presented in table 2.

Table 2. Parts composition of experimental rations

Ingredients	Starter (0-3 weeks)	Finisher (4-6 weeks)
Maize	50%	45%
Rice Bran	10%	15%
Soya bean Cake (Deoiled)	12%	12%
Groundnut Cake (Expeller)	25%	25%
Groundnut Oil	3%	3%
Mineral Mixture	2%	2%
Calcite Powder	1%	1%
Maridot	50 gm	50 gm
Naftin	25 gm	25 gm
Vitamin A, $B_{,}$, D_3 + K	20 gm	20 gm

The crude protein content of starter ration was 23 per cent and that of finisher ration was 20 per cent. The corresponding values for ME (calculated) was 3000 Kcal/kg and 3100 Kcal/kg, respectively. Experimental starter rations were offered up to 3 weeks of age and thereafter experimental finisher rations were offered up to 6 weeks of age with and without supplementation of enzyme mixture to respective groups. Feed was offered *ad libitum* to each group throughout the experimental period and group-wise feed consumption was recorded at weekly intervals.

The proximate composition of broiler starter and finisher rations, with the crude protein and ME, composition of ashwagandha and composition of enzyme mixture are presented in table 3, 4 and 5, respectively.

Table 3. Proximate composition of experimental rations (% DM basis)

S. No.	Proximate Principle	Broiler Starter	Broiler Finisher
1.	Dry Matter	94.30	93.90
2.	Crude Protein	22.95	20.05
3.	Ether Extract	2.33	2.79
4.	Crude Fibre	6.40	6.70
5.	Total Ash	11.00	9.72
6.	Nitrogen Free Extract	57.32	60.74
7.	Metabolizable energy (kcal/kg) calculated	3005.56	3180.02

Table 4. Proximate Composition of *Withaniasomnifera* (% DM basis)

S. No.	Proximate Principle	Ashwagandha
1.	Dry Matter (%)	95.93
2.	Crude Protein (%)	4.18
3.	Ether Extract (%)	0.58
4.	Crude Fibre (%)	15.02
5.	Total Ash (%)	5.35
6.	Nitrogen Free Extract (%)	74.87
7.	Ca	1.12
8.	P	0.25

Composition of multi enzyme

In the proposed experiment, commercial enzyme supplement i.e. Xzyme (Manufactured by Stallen South Asia private limited) was included in the ration @ 50 g per 100 kg of feed. Xzyme is an enzyme mixture that can be used to improve the performance of broilers. Various enzymes present in the product as reported by the manufacturer have been presented in table 5.

Table 5. Composition of multi enzyme

S. No.	Enzyme	Quantity per Kg
1.	Amylase	29000 IU
2.	Beta-glucanase	4,05,000 IU
3.	Phytase	44,500 IU
4.	Lipase	31,000 IU
5.	Protease	7,40,000 IU
6.	Cellulase	5,500 IU
7.	Pectinase	1,01,000 IU
8.	Hemicellulase	25,000 IU

Observations-

Carcass traits: To study the effect of different treatments on carcass traits *viz.*, dressed weight percentage and eviscerated weight percentage, three representative birds from each group 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.

(I) Dressed weight (%): The birds were weighed immediately before slaughtering, which was done by severing the jugular vein and 5 minute bleeding time was allowed for each bird. Dressed weight was calculated as follow:

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

(II) 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 G.I. tract.The giblet (heart, liver and gizzard) were cleaned and retained along with the carcass to record eviscerated weight and expressed as percentage of pre slaughter weight.

$$\text{Eviscerated wt. (\%)} = \frac{\text{Dressed wt. –wt. of viscera except giblet}}{\text{Live weight}} \times 100$$

RESULTS AND DISCUSSION

For Carcass traits study, the data pertaining to dress weight and eviscerated weight were recorded by slaughtering to representative birds from each group at the end of sixth week and analyzed.

The percent mean of dressed weight and eviscerated weight for various treatment groups were recorded to be 76.53 and 66.31% in T_1, 78.29 and 70.08% in T_2, 79.19 and 70.32% in T_3, 78.63 and 69.37% in T_4 and 77.82 and 68.96% in T_5 groups respectively. In E_1 and E_2 groups, the same were found to be 77.90 and 68.84% in E_1 and 78.29 and 69.18% E_2 (Table 4.9 and figure 19 and 20).

The statistical analysis of data shown in table 6(a) revealed highly significant (P<0.01) effect of supplementation of ashwagandha on dressed weight and eviscerated weight. Whereas, regarding effect of enzyme on dressed weight non-significant effect was observed. While, effect of enzyme on eviscerated weight observed significant (P<0.05)

The further comparison of means showed highest dressed weight in T_3 followed by T_4, T_2, T_5 and T_1 i.e. control. Whereas in case of eviscerated weight percentage highest eviscerated weight was observed in group T_3 followed by T_2, T_4, T_5 and T_1 (control).

These findings of study in text indicated an increase in dressing weight and eviscerated weight percentage due to supplementation of ashwagandha upto1.00% level and there after a gradual decrease in effect. The mean value was found lowest in control (T_1) in comparison to rest of treated groups which were supplemented with ashwagandha.

Javed, *et al.,* (2009) noticed significantly higher weight gain, dressing percentage, breast weight and leg weight in Ashwagandha along with other herbs treated group. Similarly Srivastva, et al., (2013) observed improvement in dressing percentage on account of ashwagandha supplementation. In previous studies the positive effects of herbal supplements on production performance and carcass quality have been demonstrated by Tekeli et al., (2006) and Tekeli et al., (2008).

Supplementation of enzyme showed a significant (P<0.05) improvement in percent eviscerated weight. In study in text and attest well. The report of Alam et al., (2003) concluded that enzyme treated groups exerts high dressing percentage in compare to control. Zakaria et al., (2010) recorded no significant effect of enzyme supplementation on carcass weight and dressing per cent.

Table 6. Effect of *Withaniasomnifera* and Enzyme on carcass traits in broiler chicks.

Main effects	Dressed Weight (%)	Eviscerated weight (%)
Ashwagandha		
T_1	76.53[a]	66.31[a]
T_2	78.29[bc]	70.08[c]
T_3	79.19[c]	70.32[c]
T_4	78.63[bc]	69.37[b]
T_5	77.82[b]	68.96[b]
SEM	0.152	0.079
Enzyme		
E_1	77.90	68.84[a]
E_2	78.29	69.18[b]
SEM	0.241	0.126

a, b, c - Means superscripted with different letters within a column differ significantly from each other.

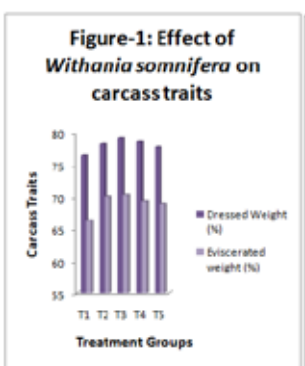
Table 6 (a) Analysis of variance for carcass traits in broiler chicks.

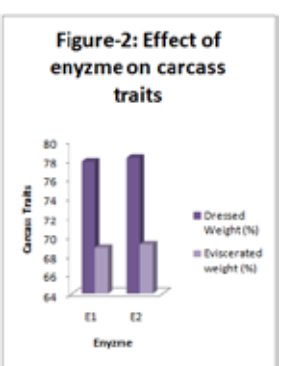
Source of Variation	DF	MEAN SQUARES	
		Dressed weight	Eviscerated weight
Ashwagandha	4	2.025**	5.161**
Enzyme	1	0.384	0.286*
Remainder	33	0.116	0.032

* = Significant (P < 0.05)

** = Highly Significant (P < 0.01)

Figures in parenthesis are the error degree of freedom





CONCLUSION

Thus, on the basis of performance of broilers. It could be concluded that the use of ashwagandha as feed additive at optimum level of 1.0% is viable proposition to improve carcass traits of broiler chicken and its combination with enzyme supplementation could also be beneficial.

Volume : 4 | Issue : 4 | April 2015 • ISSN No 2277 - 8179

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