EFFECT OF FEEDING ASHWAGANDHA AND ENZYME ALONE AND IN COMBINATION ON THE GROWTH PARAMETER OF BROILER CHICKS

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ABSTRACT

The aim of this study was to determine the optimum level of incorporation of herb i.e. ashwagandha (*Withania somnifera) as* feed additive in the ration of broilers and to assess the effect of feeding ashwagandha and enzyme alone and in combination of enzyme on the growth parameters (body weight and body weight gain) of broiler chicks, 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 five treatments were designated as T_1 control group (without herb), T_2 having 0.5% ashwagandha, T_3 having 1.0% ashwagandha, T_4 having 1.5% ashwagandha, and T_5 having 2.0% ashwagandha. All the treatment groups were further subdivided in two sub groups namely E_1 without enzyme mix supplementation and E_2 with enzyme mix supplementation @ 0.05%. Significant effect of dietary treatments i.e. incorporation of ashwagandha at different levels and enzyme on body weight and body weight gain, were observed. It could be concluded that the inclusion of ashwagandha as feed additive at 1.0% level was optimum to enhance growth performance of broiler chicken. In addition, supplementation of enzyme was also found to be beneficial to get optimum performance.

***Key words*:** Ashwagandha, broilers, enzyme, body weight gain and feed conversion ratio

Introduction

The poultry business in India is an old and traditional practice. 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. Various herbs contain growth promoter, antimicrobial, coccidiostats, antioxidants, enzymes, hormones, probiotics, buffers, organic acids mould inhibitors etc. Ashwagandha *(Withania somnifera)* is a plant of Solanaceae family. It consists of following properties viz. adaptogenic, antidepressant, liver-tonic, antioxidant, immune modulator, immune adjuvant (Ziauddin *et al.,* 1996 and Adejola *et al.* 2016) and also improve feed intake, body weight gain, FCR, haematological profile and immunological status (Mushtaq *et al.*, 2011), neuro-protective and rejuvenate muscles. 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. The benefits of using enzymes as feed additives in poultry diets include not only enhancement of bird performance, digestibility and utilization of nutrients, but also lower the environmental and ecological problems. Non-starch polysaccharides (NSPs) and other non conventional feed ingredients are having certain indigestible residues i.e. Galactosides, phytates and some antinutritional factors like pectin's, tannins and trypsin inhibitor etc. These inherent residues trap valuable nutrients and a customized blend of enzymes can unlock these trapped nutrients that improve the feed nutritive value and feed efficiency. Enzyme supplementation is recommended with the aim of enhancing the feeding values of feeds which are high in cellulose and other NSPs (Taibipour *et al.,* 2004).

Materials and Methods

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 was 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 designs. 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 *(Withania somnifera)* and enzyme were supplemented. The ashwagandha was supplemented @ 0, 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

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of experimental diets are presented in Table 2. Composition enzyme mixture are presented in Table 2 and Xzyme-Manufactured by Stallen South Asia private limited). 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 K cal/kg. 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.

Results and Discussion

The evaluation of effect of supplementation of ashwagandha (*Withania somnifera)* alone and in combination with enzyme mixture in rations on the growth performance of broiler chicks was carried out by estimating weekly body weight and weight gain.

Body weight

The body weight could be used as a indication for vitality, well being and overall performance of broiler chicks. The average body weight of broilers subjected to various treatment groups at different weeks of age have been presented in Table 4. The average body weight was recorded to increase in six weeks from 45.17 to 1662.51 g in T_1, 44.95 to 1740.62 g in T_2, 45.10 to 1774.03 g in T_3, 45.07 to 1681.82 g in T_4 and 44.97 to 1666.22 g in T_5. Likewise, in respect with effect of enzyme the increase was noticed to be 45.17 to 1673.04 g in E_1 and 44.92 to 1736.88 g in E_2 in six weeks period of experiment The data revealed highly significant (P<0.01) effect of incorporation of both ashwagandha and enzyme at II, III, IV, V and VI weeks while non significant at I week. Further, the comparison of means obtained at II week, the highest body weight was recorded for T_3 which was significantly higher than T_4. At III week, highest body weight was recorded for T_3. The mean body weight obtained for T_3 was significantly higher than treatment groups T_2 and T_5, but non significantly higher than treatment groups T_1 and T_4. The results obtained at IV week revealed that the body weight of T_3 was significantly higher than T_1, T_4, and T_5. At week V again comparison of means showed significantly (P<0.01) higher body weight in T_3group in comparison with rest of the groups followed by T_2. The T_1, T_4 and T_5 were comparable with each other and lower then T_2 and T_3. At week VI the body weight of T_3 and T_2 were though comparable with each other but statistically higher then T_1, T_4 and T_5 exhibited non significant variation from each other. The highest body weight was recorded for T_3 group and lowest body weight was noticed for T_1.Regarding effect of enzyme supplementation in initial phase, statistically differences were non significant between E_1 and E_2 up to I week but at the II III, IV, V and VI week, the body weight in enzyme supplemented group were significantly higher than unsupplemented group. From the results, it was observed that, the broiler chicks from treatment group T_3 receiving basal diet along with 1.0% level of ashwagandha attained highest live weight at the end of VI weeks followed by the broiler chicks from group T_2, T_4, T_5 and T_1 i.e. control. The broiler chicks receiving ashwagandha as a feed additive with enzyme supplementation also recorded significantly (P<0.01) higher body weight as compare to enzyme unsupplemented group at the end of VI week. The observations of body weight, recorded in the present study are in accordance with Samarth *et al*. (2002), Akotkar *et al*. (2007) Shisodiya *et al.* (2008) and Sanjyaland Sapkota (2012) recorded better body weight in broiler supplemented with ashwagandha. Significant effect of enzyme supplementation on body weight recorded in the present study corroborate well with the result of Chen *et al*. (2013) and Raju *et al*. (2013) observed improvement in body weight due to enzyme supplementation.

Body weight gain

The average weekly gain in body weight of broilers subjected to various treatment groups at different weeks of age have been presented in table 4. The overall average gain in T_1, T_2, T_3, T_4 and T_5 as well as E_1 and E_2 groups were recorded to be 1617.34, 1695.67, 1728.93, 1636.75, 1621.25 g and 1627.87 and 1691.96 g, respectively. The data of weight gain revealed that there were highly significant (P<0.01) effect of incorporation of ashwagandha supplementation on body weight gain among treatments at II, III, IV, weeks of age and overall gain in weeks. The effect of enzyme supplementation also observed highly significant (P<0.01) on body weight gain among treatment at II, III, IV and VI and overall gain in six weeks. During II week, the mean value of body weight gain for T_3 group was significantly higher than T_1, andT_4 and comparable with T_2 and T_5. While, in III week the body weight gain of T_1 T_2 and T_3 groups was comparable but lower then T_4 and higher then T_5. During IV weeks, in T_3 group body weight gain was observed to be comparable with T_2 and T_4 but significantly higher than T_1 and T_5. Thereafter in V and VI weeks no effect of ashwagandha was recorded. In respect with overall body weight gains whereas highest gain was recorded for T_3 which was significantly higher than rest of the groups. The lowest gain was recorded for T1 which was though comparable with T_2, T_4 and T_5 but lower than T_3.In respect with effect of enzyme supplementation an improvement in body weight was recorded in II, III, IV and VI weeks as well as in overall body weight gain recorded in six weeks. The result of body weight gain across weeks and overall gain in six weeks recorded in present study revealed that supplementation of ashwagandha at 1% level is optimum and also supplementation of enzyme mix to the basal diet had added advantage. Raghavan *et al*. (2011) and Mushtaq *et al*. (2011) reported that dietary supplementation of ashwagandha improved growth in broiler chicken with highest weight gain in birds supplemented with ashwagandha per kg of feed. The results regarding use of enzyme mix recorded in present study corroborate well with the finding of Suman *et al*. (2009).

Thus, on the basis of growth parameters, it could be concluded that the use of ashwagandha as feed additive at optimum level of 1.0% is viable proposition to enhance performance of broiler chicken and its combination with enzyme supplementation could also be beneficial to get optimum performance.

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Table 1 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_2, D_3 + K	20 gm	20 gm

Table 2: 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

Each kg of enzyme mixer contain: - Lactic Acid Bacillus 30,000 million spores and *Saccharomyces cervisiae* 100 billion CFU (colony forming unit).

Table 3: Effect of Ashwagandhaand Enzyme on body weight (g) at different weeks

Main effects	0	I	II	III	IV	V	VI
Ashwagandha							
T_1	45.17	167.20	374.17^{ab}	735.94^{ab}	1047.07^{a}	1361.33^{a}	1662.51^{a}
T_2	44.95	161.97	372.24^{ab}	731.81^{a}	1105.97^{bc}	1424.79^{b}	1740.62^{b}
T_3	45.10	171.34	402.77^{b}	769.70^{b}	1150.36^{c}	1472.70^{c}	1774.03^{b}
T_4	45.07	167.72	353.63^{a}	735.71^{ab}	1083.74^{ab}	1377.30^{a}	1681.82^{a}
T_5	44.97	167.58	384.28^{ab}	736.32^{a}	1046.82^{a}	1372.22^{a}	1666.22^{a}
SEM	0.74	10.07	25.44	29.27	42.99	41.89	36.05
Enzyme							
E_1	45.17	165.72	367.71^{a}	723.71^{a}	1046.71^{a}	1357.57^{a}	1673.04^{a}
E_2	44.92	168.59	387.17^{b}	760.17^{b}	1126.58^{b}	1445.4^{b}	1736.88^{b}
SEM	1.17	15.92	40.23	46.28	67.97	66.24	56.99

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

Table 4: Effect of Ashwagandhaand Enzyme on body weight gain (g) at different weeks

Main effects	0-I	I-II	II-III	III-IV	IV-V	V-VI	I-VI
Ashwagandha							
T_1	122.05	206.50^{ab}	359.07^{ab}	311.12^{a}	314.26	301.17	1617.34^{a}
T_2	116.98	210.27^{bc}	359.10^{ab}	374.16^{b}	318.82	315.82	1695.67^{ab}
T_3	126.22	231.43^{c}	366.93^{ab}	378.05^{b}	322.66	301.33	1728.93^{c}
T_4	122.66	186.52^{a}	380.77^{b}	348.03^{b}	293.46	289.01	1636.75^{ab}
T_5	122.61	216.7^{bc}	349.70^{a}	310.5a	301.74	309.59	1621.25^{ab}
SEM	9.99	17.90	19.18	27.04	41.25	25.95	111.67
Enzyme							
E_1	120.55	201.73^{a}	354..83^{a}	322.42^{a}	30137	315.46^{a}	1627.87^{a}
E_2	123.64	219.06^{b}	371.45^{b}	365.41^{b}	318.81	291.48^{b}	1691.96^{b}
SEM	15.81	28.31	30.33	42.75	65.22	41.08	176.56

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

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