



Original Research Paper

Use of *Tinospora cordifolia* as poultry feed supplement

U. Bhardwaj¹, B. K. Tiwary¹, A. Prasad¹ and S. Ganguly^{2*}

¹Department of Veterinary Microbiology, Faculty of Veterinary Science & Animal Husbandry, Birsa Agricultural University, Ranchi 834 006, India

²AICRP-PHT (Kolkata Centre), Department of Fish Processing Technology, Faculty of Fishery Sciences, West Bengal University of Animal and Fishery Sciences, Kolkata 700 094, India

*Corresponding Author, e-mail: ganguly38@gmail.com

Abstract

The present study was done to study the average body weight gain and increase in feed conversion efficiency in broiler chicks administered with different preparations of *Tinospora cordifolia* stem extracts orally mixed in their feed. After the trial, significant improvements were evidenced as increase in average body weight gain and overall feed conversion efficiency in the birds.

Keywords: Body weight gain, Broiler chicks, Feed conversion efficiency, *Tinospora cordifolia*

Introduction

An immunomodulator is a substance which stimulates or suppresses the components of immune system including both innate and adaptive immune responses [1]. The modulation of immune system by various medicinal plant products has become a subject for scientific investigations currently worldwide. One such plant, *Tinospora cordifolia*, commonly called 'Guduchi' has been examined for its immunomodulatory properties. Guduchi is a local term meaning to rejuvenate dead cells. It is widely used in veterinary folk medicine among local tribes and has also been claimed to be beneficial for human beings according to *Ayurveda* for the cure of jaundice, skin diseases, diabetes, anemia, emaciations and various infections for its anti-spasmodic, anti-inflammatory, anti-arthritic and anti-allergic properties [2]. It has also been reported that it improves the phagocytic and bactericidal activities in patients suffering from polymorphism in surgical jaundice [3].

Levamisole, a broad spectrum anthelmintic is also used as a chemical compound for immunomodulation. In vivo and in vitro studies of immunomodulation have proved levamisole to be a potent immunomodulating agent which acts on both cellular and humoral immune responses.

Presently, poultry farming has gained immense importance in the socio-economic scenario in Indian livestock sector. For enhanced productivity of eggs and meat, it is needed for cheaper feed supplements which improve the overall weight gain of the birds and their feed conversion efficiency within short period of time. So, nowadays research are being carried out by scientists regarding different herbal preparations in this regard, as these also possess adequate immunomodulating effects which augment the resistance of the birds against various infectious diseases. The present study has been carried out with the objective of increase in total body weight gain and feed conversion ratio after the oral administration of *T. cordifolia* stem extracts mixed with their feed mash in different preparations.

Materials and Methods

One hundred apparently healthy day old broiler chicks were procured from a private poultry farm. All the chicks were maintained under standard conditions of feeding and management. The chicks were divided into six groups comprising of 15 birds each. The chicks of the first group were fed with aqueous extracts of *T. cordifolia* stem dried at high temperature @ 1 gm/kg feed and were vaccinated against La Sota strain Newcastle disease (ND) virus as per the recommended schedules. The chicks of the second group were fed with aqueous extracts of *T. cordifolia* stem dried at low temperature @ 1 gm/kg feed and were vaccinated against ND as per the recommended schedules. The chicks of third group were fed *T. cordifolia* stem juice concentrate in *T. cordifolia* powder at low temperature @ 1 gm/kg feed and were vaccinated against ND as per recommended schedule. The chicks of fourth group were not provided with *T. cordifolia* extract but were vaccinated accordingly against ND. The chicks belonging to the fifth group were not provided with an extract and they were also unvaccinated. The chicks belonging to the last (sixth) group were offered with levamisole @ 10 mg/kg body weight and were vaccinated with ND vaccination as per recommendation and were kept as control group. Levamisole is already a known potential immunomodulator in chicks. Chicks from all the groups were also vaccinated with Georgia strain of infectious bursal disease virus leaving the fifth group completely unvaccinated throughout the present study.

The live body weight of chicks was measured at weekly intervals on 1st, 7th, 14th, 21st, 28th, 35th and 42nd days of experiment. The feed efficiency was calculated in terms of feed conversion (gain) ratio.

Feed conversion efficiency was measured at weekly intervals on the basis of total feed intake and total gain in body weight. The feed conversion efficiency was interpreted as given below:

$$\text{Feed conversion efficiency (ratio)} = \frac{\text{Total feed consumed (gm) in particular period}}{\text{Total body weight gain (gm) during same period}}$$

Statistical analyses for different parameters were done as per the method described by Snedecor and Cochran [4].

Results and Discussion

On day 1, the average body weight recorded was 42.533 ± 1.524 g. On 7th day, chicks were divided equally into six groups randomly comprising of 15 chicks each. The average body weight ranged from 126.00 ± 2.518 g in Group III to 129.067 ± 2.681 g in Group VI respectively (Table 1). Analysis of variance (ANOVA) showed non-significant effect of groups on body weight at 14th and 21st days, but its effect was significant at 28th, 35th and 42nd days of age. At day 28, Group III and VI did not differ significantly to each other as well as from other groups. Significantly higher (P<0.05) value was observed in Group II (974.733 ± 14.268 g) followed by Group I, III and VI respectively which did not differ significantly among themselves. At 35th day, no significant difference was recorded between Groups I, II, III, IV and VI respectively. Group IV did not differ significantly from Group V as well. On 42nd day of the study i.e. on the last day, no significant difference was observed in body weight gain between the different groups. Although, groups had non-significant differences in feed conversion efficiency, but better efficiency was observed in Group I (2.005:1) as compared to the other groups (Table 2).

Table 1. Average body weight (gm) in broiler birds of various treatment groups.

| Age of chicks (in days) | Group I | Group II | Group III | Group IV | Group V | Group VI | ANOVA value |
|-------------------------|-----------------------------|-----------------------------|------------------------------|------------------------------|-----------------------------|-----------------------------|---------------------|
| 1 | 42.533±1.524 | 42.533±1.524 | 42.533±1.524 | 42.533±1.524 | 42.533±1.524 | 42.533±1.524 | NA |
| 7 | 128.133±1.403 | 127.333±2.357 | 126.200±2.518 | 126.067±2.681 | 127.533±1.492 | 129.267±3.822 | NA |
| 14 | 311.00±4.603 | 306.00±5.656 | 299.83±6.280 | 297.330±4.631 | 295.833±3.813 | 298.20±4.508 | 1.398 ^{NS} |
| 21 | 563.20±8.92 | 560.33±9.334 | 549.13±10.334 | 538.73±5.098 | 530.6±6.425 | 546.43±9.25 | 2.223 ^{NS} |
| 28 | 969.933±13.497 ^b | 974.733±14.268 ^b | 943.4±13.225 ^{ab} | 924.533±11.094 ^a | 915.27±14.121 ^a | 943.2±14.351 ^{ab} | 3.11 [*] |
| 35 | 1452.4±20.15 ^b | 1446.4±21.422 ^b | 1422.73±17.43 ^b | 1408.867±15.98 ^{ab} | 1368.2±17.825 ^a | 1419.47±11.67 ^b | 2.914 [*] |
| 42 | 1900.933±26.57 ^c | 1905.733±27.71 ^c | 1855.73±27.388 ^{bc} | 1823.47±27.19 ^{ab} | 1762.93±33.121 ^a | 1856.67±19.99 ^{bc} | 3.782 ^{**} |

(*P<0.05), (** P<0.01), NA: Not applicable, NS: Not significant,

Values bearing different superscripts in a row differed significantly; Each value is an average of fifteen observations.

Table 2. Feed conversion efficiency (ratio) at different periods in treatment groups of broiler chicks.

| Period (in days) | Group I | Group II | Group III | Group IV | Group V | Group VI |
|---------------------|---------|----------|-----------|----------|---------|----------|
| 1-7 | 1.18:1 | 1.18:1 | 1.18:1 | 1.18:1 | 1.18:1 | 1.18:1 |
| 7-14 | 1.88:1 | 1.876:1 | 1.932:1 | 1.981:1 | 2.001:1 | 1.965:1 |
| 14-21 | 1.978:1 | 1.980:1 | 2.000:1 | 2.05:1 | 2.11:1 | 2.01:1 |
| 21-28 | 2.056:1 | 2.062:1 | 2.100:1 | 2.14:1 | 2.16:1 | 2.12:1 |
| 28-35 | 2.105:1 | 2.108:1 | 2.142:1 | 2.156:1 | 2.185:1 | 2.153:1 |
| 35-42 | 2.206:1 | 2.21:1 | 2.27:1 | 2.31:1 | 2.367:1 | 2.282:1 |
| 1-42 (overall) | 2.005:1 | 2.007:1 | 2.042:1 | 2.075:1 | 2.106:1 | 2.056:1 |

The findings in the present study have been supported by the reports of Sarag and Khobragade [5] in which higher live body weight gain in broiler birds were observed after supplementation with *T. cordifolia*. The findings in this study are also supported by Thatte *et al.* [6] in which he recorded higher body weight gain in mice supplemented with *T. cordifolia*. Levamisole is also reported to induce increased body weight gain by the studies of Mani *et al.* [7] and Panda and Rao [8] in which they had observed and reported the effects of levamisole in broiler chicks infected with infectious bursal disease virus.

Summary

The present study showed that herbal preparations of *T. cordifolia* stem extract can be beneficially used as an effective feed supplement in poultry for its encouraging results in relation to total body weight gain and feed conversion efficiency in the broiler chicks. It can also be used potentially before mass vaccination of the chicks for its property of immunomodulation like levamisole.

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