The effect of *Tinospora cordifolia* (Seenthil chooranam) in broiler chicken

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**Abstract**

The study was aimed to investigate the effect of Seenthil chooranam (*Tinospora cordifolia*) in broiler chicken. Sixty number of day old broiler chicks were distributed randomly into three groups of 20 each. All chicks were vaccinated against Ranikhet disease (Lasota strain) at seventh day and 21st day. Vaccine against infectious bursal disease was given on 14th and 28th day. From eighth day to 14th day the Ts of birds were given Seenthil chooranam powder at the dose rate of 0.5g/Kg of feed and Tg group of birds were given a decoction of Seenthil chooranam at the dose rate of 1mL/Kg body weight. Ts was kept as normal control with basal feed. Body weight was measured at weekly intervals and blood samples were collected on days 7, 14, 21, 28, and 36 of the study from all the experimental birds to measure Newcastle disease antibody titre using Haemagglutination Inhibition (HI). Data obtained from the experiment was subjected to statistical analysis. The present study revealed that Seenthil chooranam did not have much influence on HI titre and body weight of birds. Administration of treatment for short duration might be the reason. Therefore, it is recommended to give treatment for long duration for better results. However, Seenthil chooranam showed protective effect in birds against bacterial disease and reduced the mortality.

**Keywords:** *Tinospora cordifolia*, Seenthil chooranam, broiler chicken

**Introduction**

India is the third largest producer of eggs and fourth largest producer of poultry meat among all the countries. Poultry industry is one of the important contributors to the economy of rural and semi-urban India. The organized sector of the poultry industry is contributing nearly 70% of the total output and the rest 30% is the unorganized sector. The broiler industry is well dominated in southern states in our country with nearly 60-70% total output coming from these states. The layer industry is represented more in southern states especially, Andhra Pradesh, Tamil Nadu and Maharashtra producing nearly 70% of the country’s egg production. Even though Indian poultry sector has emerged as a self-reliant, technology driven industry, with capability to produce every essential input for successful poultry farming, Newcastle disease (ND) outbreak is occurring here and there.

Newcastle disease is a highly contagious viral disease of domestic poultry, cage and avairy birds and wild birds characterised by digestive, respiratory and/or nervous signs. The disease has a number of strains that differ in the severity of their clinical signs, ranging from in apparent infection to a rapidly fatal condition. Vaccination may not always prevent virus infection. This depends on the vaccine strain used and the challenge/field strain infecting the bird afterwards. Lower the similarity between vaccine and challenge/field strain, lower the efficacy to prevent infection. There has been a number of publications showing that vaccination will reduce the clinical signs, but when the challenge/field strain is distantly related to the vaccine, infection can still happen and birds can still shed the virus, contributing in spreading the virus. So in these cases, vaccination could even mask on going virus circulation, even of velogenic Newcastle disease viruses.

Hence there is an increasing demand for exploring new compounds with antiviral and immunomodulatory activity against Newcastle disease virus. These problems highlight the advantages of herbal remedies as an alternative. The use of plant derived natural substances used as immunomodulatory agents is cheaper, more reliable and less toxic. Perusal of literature revealed the benefits of various phytochemicals on innate and adaptive components of the immune system of poultry. Hence Seenthil chooranam, a Siddha preparation containing 100 per cent *Tinospora cordifolia* successfully being used in the treatment of pyrexia and immunomodulation in human was attempted in broiler chicken.
Materials and Methods

The study was conducted at the local broiler farm at Pudhupalapattu village, Kallakurichi district of Tamilnadu.

Experimental Birds

Sixty number of day-old Cobb 400 broiler chicks were procured from a local broiler hatchery. All the chicks were vaccinated against Ranikhet disease (Lasota strain) on the seventh day and 21st day. Vaccine against infectious bursal disease was given on 14th and 28th day. All the birds were maintained in well-ventilated area under deep litter system and fed ad libitum.

Plant Material

The Seenthil choornam which contains whole plant Tinospora cordifolia (100 per cent) supplied by Tamilnadu Medicinal Plant Farms and Herbal Medicine Corporation Limited was used for this study.

Experimental Shed Preparation

Disinfection

The experimental shed was properly cleaned. One week before the start of the experiment, the walls as well as the floor of the shed was applied with slaked lime. Fumigation was done at 3X concentration (KMnO4 60 gram plus formalin 120 mL). The feeders, waterers and other equipments were also properly cleaned and disinfected with Viruclean (a stabilized blend of peroxygen compounds, surfactant, organic acids and an inorganic buffer system from Vetcare biosecurity international, UAE) one week before the chicks were housed. The disinfection of the shed was done using Kohrsolin-TH (active content being Glutaraldehyde 7.0 g per 100 mL) solution with a dilution of 5.0 mL per litre of water (manufactured by Hamburg, Germany, marketed in India by Glaxo Smithkline Pharmaceuticals Ltd., Agrivet Farm Care Div, Mumbai). 11

Housing and management

The birds were maintained under deep litter system during the experimental period of five weeks. Wood shavings used as the litter material were procured locally. Each group was housed in separate pens in the same shed with facilities for feeding and watering. All the birds were maintained under identical management conditions. Feed and clean drinking water were provided ad libitum in all the pens throughout the experimental period.

Feeding management

Broiler pre-starter, starter and finisher mash feed as per BIS 2012 standard were procured from CB Feeds Manufacturing Ltd.

Treatment Protocol

Sixty number of day old broiler chicks were distributed randomly into three groups of 20 each. All chicks were vaccinated against Ranikhet disease (LaSota strain) at seventh day and 21st day. Vaccine against infectious bursal disease was given on 14th and 28th day. All the birds were maintained in well-ventilated area under deep litter system and fed ad libitum with normal feed for first seven days. Decoction of Seenthil choornam powder was prepared by taking five grams powder in 100 mL water and concentrating to 25mL and kept overnight. It was filtered and administered to the birds at the dose rate of 1mL/ Kg body weight. The required quantity of decoction was calculated, prepared freshly and mixed with small quantity of drinking water and provided in the morning. From eighth day to 14th day the treatments were given as shown in table 1.

Table 1: Treatment protocol Group

<table>
<thead>
<tr>
<th>Treatments</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
</tr>
<tr>
<td>T2</td>
</tr>
<tr>
<td>T3</td>
</tr>
</tbody>
</table>

Body weight was measured at weekly intervals using electronic weighing balance and blood samples were collected on days 7, 14, 21, 28, and 36 of the study using Whatman filter paper size no. 1 from all the experimental birds to measure Newcastle disease antibody titre using Haemagglutination Inhibition (HI) Test and the result was reported as log2 HI (Abdu et al., 2012)11.

Statistical Analysis

Data obtained from the experiment were subjected to statistical analysis using one-way ANNOVA followed by Duncan’s multiple range tests for comparison between groups and the results were expressed as Mean ± Standard error (SE) for twenty birds in each group. All the statistical analysis was computed using SPSS software version 20.

Results and Discussion

In the present study, evaluation of effect of Seenthil choornam in broiler chicken was carried out. The results obtained for various parameters are tabulated and presented here

Body Weight

The mean values of body weight of birds of the entire groups on days 0, 7, 14, 21, 28 and 36 are presented in table 2. The initial body weight was similar in T1 to T3 which was 54.20 ± 0.37, 54.20 ± 0.47, 54.35 ± 0.54 g respectively. The mean body weight of the birds belonging to the T1 to T3 for first week was 182.90 ± 1.47, 180.35 ± 2.07, 179.80 ± 4.13 g, for second week was 413.40 ± 5.48, 426.95 ± 4.94, 410.05± 5.87 g for third week was 869.00 ± 26.28, 897.95 ± 19.23, 840.95 ± 12.56g, for fourth week was 1289.80 ± 30.85, 1404.25 ± 27.79, 1256.60 ± 29.84g, for fifth week was 1901.50 ± 15.19, 1914.65 ± 15.97, 1999.00 ± 9.11 g, respectively. There was only numerical difference in body weight between the groups for the first three weeks. On the fourth week the Seenthil choornam powder treated group (T2) showed significantly higher body weight than other groups. On the fifth week, the birds fed with Seenthil choornam decoction (T3) showed significant increase in body weight than other groups.

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HI Titre
The mean values of HI titre of birds of the entire groups on days 7, 14, 21, 28 and 36 are presented in table 3. The initial HI titre, before starting of treatment was similar in T1 to T3 which was 3.35 ± 0.18, 3.05 ± 0.05, 3.00 ± 0.00 respectively. The mean HI titre of the birds belonging to T1 to T3 on fourteenth day was 3.20 ± 0.91, 3.05 ± 0.05, 3.10 ± 0.07, on the twenty first day was 3.20 ± 0.12, 3.00 ± 0.00, 3.20 ± 0.12, on twenty-eight day was 3.00 ± 0.00, 3.00 ± 0.00, 3.20 ± 0.00 and on thirty sixth day was 3.15 ± 0.15, 3.40 ± 0.18, 3.50 ± 0.17. There was no significant difference between the groups in all the days.

Table 3: Effect of Seenthil choornam on HI titre (log2) value in broiler chicken (Mean ± SE, n=20) Groups

<table>
<thead>
<tr>
<th>Group</th>
<th>7th day</th>
<th>14th day</th>
<th>21st day</th>
<th>28th day</th>
<th>36th day</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>3.35 ± 0.18</td>
<td>3.20 ± 0.91</td>
<td>3.20 ± 0.12</td>
<td>3.00 ± 0.00</td>
<td>3.15 ± 0.15</td>
</tr>
<tr>
<td>T2</td>
<td>3.05 ± 0.05</td>
<td>3.05 ± 0.05</td>
<td>3.00 ± 0.00</td>
<td>3.00 ± 0.00</td>
<td>3.40 ± 0.18</td>
</tr>
<tr>
<td>T3</td>
<td>3.00 ± 0.00</td>
<td>3.10 ± 0.07</td>
<td>3.20 ± 0.12</td>
<td>3.00 ± 0.00</td>
<td>3.50 ± 0.17</td>
</tr>
<tr>
<td>F value</td>
<td>0.056ns</td>
<td>0.334ns</td>
<td>0.240ns</td>
<td>-</td>
<td>0.325ns</td>
</tr>
</tbody>
</table>

Total Mortality Rate
For the first five weeks there was no mortality in all the three groups. After the fifth week three birds died in T1 group. Post-mortem examination revealed that death was due to clostridial enteritis. Total Mortality rate calculated in percentage given in table 4.

Table 4: Effect of Seenthil choornam on total mortality rate in broiler chicken

<table>
<thead>
<tr>
<th>Group</th>
<th>Total mortality rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>15 (3/20)</td>
</tr>
<tr>
<td>T2</td>
<td>(0/20)</td>
</tr>
<tr>
<td>T3</td>
<td>(0/20)</td>
</tr>
</tbody>
</table>

Body Weight
In this study, there was no significant difference in the body weight of birds between the groups for the first three weeks. On the 28th day the birds treated with Seenthil choornam powder (T2) @ the dose rate of 0.5 g/ Kg of feed showed significantly higher body weight than the other two groups. On the 36th day the birds given with Seenthil choornam decoction (T3) @ the dose rate of 1 mL/ Kg body weight showed significant increase in body weight than other groups. This result is in accordance with Bhardwaj et al. (2011) [4, 5] who reported that no changes in the body weight of broiler chicken until 21 days of age and there was a significant increase in body weight at 28th and 36th days of age when birds were fed with T. cordifolia stem extracts. The result also supported by Singh et al. (2018) [23] who observed a significant increase in the body weight of birds when fed with T. cordifolia @ the dose rate of 0.5 g / Kg body weight.

The positive effect on growth performance of broilers may be attributed to active principles of T. cordifolia (tinosporine) which limits the metabolic signs of stress and alleviate the physiological consequences of stress (Singh et al., 2018) [23].

HI Titre
There was no significant difference in HI titre against Newcastle disease virus between the groups in all the days. Before the first dose of vaccination, all the birds had protective level of antibody titre. After that there was fluctuation among the groups. On the 36th day, there was a numerical increase in the HI titre value in T3 group of birds followed by T2 group. Due to the haemagglutinating property of Newcastle disease (ND) virus HI test has been used as a standard test to measure specific antibodies against ND virus. The HI titre of 0 to 2 is generally considered negative as it produces no antibody against the virus when infected. HI value of 3 to 12 is considered as protective for chickens (Alders et al., 2000; Baksi et al., 2016) [3]. In this study, addition of Seenthil choornam did not influence much on HI titre. It might be due to short duration of treatment. According to (Baksi et al., 2016) [3] the antibody level reached to much satisfactory level after 28 days of vaccination in backyard poultry. In this study, up to 28 days, the birds showed protective level of titre. After 28 days, the broiler birds showed numerical increase in the HI titre especially in T3 group.

Total Mortality Rate
In this study, up to 36 days, there was no mortality. After that three birds died in normal control and post-mortem was conducted and the post-mortem lesions revealed that birds died due to clostridial enteritis. There was no mortality in T2 and T3. It might be due to antibacterial property of T. cordifolia, Mishra et al. (2014) [15].

References


12. Kavitha BT, Shruthi SD, Rai SP, Ramachandra YL. Phytochemical analysis and hepatoprotective properties of Tinospora cordifolia against carbon tetrachloride-induced hepatic damage in rats. Basic & Clinical Pharmacology & Toxicology. 2011; 2:139-142.


