Effect of supplementation of prebiotic and probiotic on immunity of broilers chicken

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Abstract

The present study was conducted to evaluate the effect of supplementation of prebiotics and probiotics on immunity of broiler chickens. 240 day old chicks were randomly distributed in four equal groups of five replication each containing twelve birds. T-1 group was control with basal diet, T-2 group basal diet with probiotic (ozolab@0.5g/kg feed), T-3 group basal diet with prebiotic (ecomos@1g/kg feed) and T-4 group supplemented with basal diet alongwith both probiotic and prebiotic (bacilplus). Results revealed that serum antibody titre against Ranikhet Disease virus based on HI Test shown significant difference between different treatment groups during 28th and 42nd day of experimental period. However on 14th day antibody titre against Ranikhet Disease virus had non-significant effect on different treatment group. Serum antibody titre against IBD virus based on HI Test in broiler chickens incorporated feed supplement shown significant (P<0.05) difference between different treatment groups during 42nd day of experimental period. However, on 14th and 28th day did not reveal any statistical difference between different treatment groups.

It was concluded that treatment group supplemented with combination of prebiotic and probiotic exhibit significant difference in terms of immunity against ranikhet disease and infectious bursal disease during both 28th and 42nd day as well 42nd day of experiment respectively.

Keywords: prebiotic and probiotic, broilers chicken

Introduction

In order to met the consumer demand of animal meat poultry sector in India adopted the intensive farming practices. In intensive farming system birds were subjected to high stocking density leads to increase in stress level so level of immunity affected. Previously subtherapeutics level of antimicrobials were used in this regard but due to growing antibiotic resistance against bacteria and increasing consumer awareness about food safety comes to an end of use of this practice. Now a days biotic feed additive likes prebiotics and probiotics are used to augment the poultry meat production and it is essential to minimize escalating feed cost as to sustain profitability as well as enhancing the immunity of broiler chicken. An increased level of immunity helps the bird to counteract the stressful scenario of intensive production system. Prebiotics are defined as nondigestible feed ingredients which beneficially affect the host by selectively stimulating the growth and activity of one or limited number of bacteria in intestine that can improve the host health. (Gibson and Roberfroid 1995) [4]. Gong et al. (2002) [10] define probiotics as health-promoting bacteria inhabiting the gastrointestinal tract of humans and animals. The major probiotic strains include Lactobacillus, Saccharomyces, Bacillus, Streptococcus and Aspergillus (Tannock, 2001) [14]. Poultry production match the international level of competence in India by following strict regimen of proper and standard managemental practices and most importantly alert and well developed immune status of bird. Prebiotics and probiotics aid in enhancing immune status of bird. Moreover, it has been reported that probiotics and prebiotics have positive effects on the immunity system (Zulkifli et al., 2000; Huang et al., 2007; Abdel-Fattah et al., 2008) [8, 3, 9]. In addition, previous report suggest that probiotic supplementation resulted in significant improvement in antibody responses in broiler and layers (Cotter et al., 2000; Raju and Devegowda, 2002) [3]. At present only scanty account is being maintained regarding effect of biotic feed supplement on affecting the immunity status of broilers chickens. Hence present investigation was undertaken to study and compare the effect of these additives on immunity.
status of broiler chicken.

Materials and Method
Location of study
The study was conducted in the experimental poultry shed of Bihar veterinary college patna in June to August.

Birds and treatment
240 day old commercial broilers chicks were procured from the market. All chicks were of same hatch in order to keep the genetic makeup uniform. The selected chicks were wing banded, weighed individually and randomly divided into four groups containing sixty chicks in each group. Each group is further triplicated five times. The dietary treatment comprised of T2 (basal diet + probiotic ozolab@0.5g/kg feed), T3 (basal diet + probiotic ecosmos@1g/kg feed) and T4 (basal diet + probiotic@0.5g/kg feed + probiotic@1g/kg feed). The T1 group was kept as control maintained on basal diet without dietary supplementation. Chicks were kept under deep litter system. Feed and water were provided ad-libitum and standard managemental practices were followed. Chicks were vaccinated against RD on day seven and twenty first day by intraocular route. IBD vaccine were given on 7th day by intraocular route.

Blood sampling
Blood were taken from wing vein of poultry of different treatment groups first at 14th days then at weekly interval till the termination of experiment. Sera were separated and subjected to HI test and AGPT test to assess immunity against Ranikhet disease and IBD, respectively. The design of this experiment was Completely Randomised Design (CRD) with 5 replication each. It was analyzed with analysis of variance procedure Snedecor and Cochran 1994.

Result & Discussions
Serum antibody titre against Ranikhet Disease virus based on HI Test in broiler chickens show significant difference between different treatment groups during 28th and 42nd day of experimental period. However on 14th day antibody titre against Ranikhet Disease virus had non-significant effect on different treatment group. According to the data, it may be seen that a significantly (P<0.05) higher antibody titre (5.31±0.34) was exhibited in the birds of T4 group, containing combination of both the probiotics and prebiotics followed by the birds of group T3 (5.28±0.34) i.e. prebiotics supplemented diets during 28th day of experiment. Diets with combination of probiotics and prebiotic supplemented group (T4) and prebiotics supplemented group (T3) registered significantly (P<0.05) higher values of antibody titre against RD virus as compared to control group (T1). Synbiotic supplemented group (T4) showed significantly (P<0.05) higher antibody titre against RD virus than unsupplemented control group (T1) on 42nd day of experiment. Chicks fed diet with of probiotics (T2) and prebiotics (T1) singly showed nonsignificantly (P<0.05) lowest antibody titre against RD virus as compared to T4 group during 14th day of experiment. However there was numerically comparable difference among themselves during that period. Antibody titre on 42nd day of experiment followed the similar trend of 28th day titre among all the treatment groups.

Table 1: Effect of probiotic and prebiotic supplementation on antibody titre against Ranikhet Disease in broiler chicken.

<table>
<thead>
<tr>
<th>Age (days)</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
</tr>
</thead>
<tbody>
<tr>
<td>14th</td>
<td>2.08±0.23</td>
<td>2.03±0.23</td>
<td>2.03±0.23</td>
<td>2.03±0.23</td>
</tr>
<tr>
<td>28th</td>
<td>5.01±0.34</td>
<td>5.27±0.34</td>
<td>5.28±0.34</td>
<td>5.31±0.34</td>
</tr>
<tr>
<td>42nd</td>
<td>5.04±0.449</td>
<td>5.87±0.449</td>
<td>5.90±0.449</td>
<td>5.98±0.449</td>
</tr>
</tbody>
</table>

Table 2: Effect of probiotic and prebiotic supplementation on antibody titre against Infectious Gumboro Disease (IBD) in broiler chicken.

<table>
<thead>
<tr>
<th>Age (days)</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
</tr>
</thead>
<tbody>
<tr>
<td>14th</td>
<td>2.30±0.20</td>
<td>2.23±0.20</td>
<td>2.23±0.20</td>
<td>2.23±0.20</td>
</tr>
<tr>
<td>28th</td>
<td>4.58±0.28</td>
<td>4.82±0.28</td>
<td>4.88±0.28</td>
<td>4.96±0.28</td>
</tr>
<tr>
<td>42th</td>
<td>5.02±0.32</td>
<td>5.31±0.32</td>
<td>5.40±0.32</td>
<td>5.52±0.32</td>
</tr>
</tbody>
</table>

Serum antibody titre against IBD virus based on HI Test in broiler chickens show significant (P<0.05) difference between different treatment groups during 28th day of experimental period. However, on 14th and 28th day did not show any statistical difference between different treatment groups and it represented that titre of all four treatment groups are same but result obtained from second HI test on 28th day revealed that there was not any statistical difference among different treatment groups but there were numerical increase in antibody titre against IBD virus in each four different treatment groups in compare with control group. This increase in antibody titre was more in group T4. According to the data, it may be seen that a significantly (P<0.05) higher antibody titre (5.52±0.32) was exhibited in the birds of T4 group containing combination of both the probiotics and prebiotics followed by the birds of group T3 (5.40±0.32) i.e. prebiotics supplemented diets. Diets with combination of probiotics and prebiotics supplemented group (T4) and prebiotics supplemented group (T3) registered significantly (P<0.05) higher values of antibody titre against RD virus as compared to control group (T1). Synbiotic supplemented group(T4) showed significantly (P<0.05) higher antibody titre against RD virus than unsupplemented control group (T1) on 42nd day of experiment. Chicks fed diet with of probiotics (T2) and prebiotics (T1) singly showed non-significantly (P<0.05) lowest antibody titre against RD virus as compared to T4 group. However there was numerically comparable difference among themselves.

This study is in consonance with kim et al. 2009 [15] who reported that increase in IgA concentration by supplementation of MOS and FOS. Cetin et al. also reported that supplementation of MOS enhances IgG level in turkey. Woo et al. 2007 [17] also reported that IgG level was increased by MOS supplementation in layer. Yin et al. 2008 [16] also reported same observation that supplementation of prebiotic like MOS increased the IgA, IgG and IgM level in early weaned pig. Moreover, these investigations are further authenticated by the work of many researchers such as Jin et al. (1997) [11] and Shoeib et al. (1997) [12] reported improved immunity in the commercial broiler chickens by continuous feeding of the probiotic. Moreover, the results are also supported by the findings of Panda et al. (2000) [13] who tested the immune response to Escherichia (E) coli of broilers fed diets with various levels of probiotic. Rowghani et al. (2007) [18] reported that broiler chickens fed diet supplemented with probiotic had a significant increase in the Newcastle antibody
titers compared with those of control group. Although several earlier experiments evaluating the influence of the MOS on antibody responses have pro-duced similar findings ( Cotter et al., 2000, 2002; Raju and Devegowda, 2002) [1, 2], Shafey et al. (2001) [5] reported no such improvement in the antibody titers against IBDV and Newcastle disease virus in broilers fed MOS. Huang et al. (2007) [3] concluded that dietary addition of oligochitosan resulted in a better immunity response as measured by elevated levels of serum antibody titre against Newcastle disease and immunoglobulins (IgM, IgA and IgG).

Conclusion

Result of present study indicates that supplementation of synbiotic reveals significant difference on antibody titer against RD & IBD.

References


