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Tanveer Alam
M.V.Sc student, Bihar
Veterinary College, Patna, Bihar,
India

SP Sahu
Assistant Professor, Bihar
veterinary College, Patna, Bihar,
India

Sanjeev Kumar Singh
SMS (Animal Sci), Holy Cross
KVK, Hazaribagh, India

Correspondence
Tanveer Alam
M.V.Sc student, Bihar
Veterinary College, Patna, Bihar,
India

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

Tanveer Alam, SP Sahu and Sanjeev Kumar Singh

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 prebiotic and probiotic (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 augument 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 managerial 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 of 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 prebiotic supplementation resulted in significant improvement in antibody responses in broiler and layers (Cotter *et al.*, 2000; Raju and Devegowda, 2002) [2]. 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 + prebiotic ecomos@ 1g/kg feed) and T₄ (basal diet + probiotic@0.5g/kg feed + prebiotic@ 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 managerial 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 Ranikhet Disease virus as compared to control group (T₁) during 28th day of experiment. Synbiotic supplemented group (T₄) showed significantly ($P < 0.05$) higher antibody titre against Ranikhet Disease virus than unsupplemented control group (T₁) on 28th day of experiment. Chicks fed diet with of probiotics (T₂) and prebiotics (T₃) 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.

Age (days)	T ₁	T ₂	T ₃	T ₄
14th	2.08±0.23	2.03±0.23	2.03±0.23	2.03±0.23
28th	5.01±0.34	5.27±0.34	5.28±0.34	5.31±0.34
42nd	5.04±0.449	5.87±0.449	5.90±0.449	5.98±0.449

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

Age (days)	T ₁	T ₂	T ₃	T ₄
14th	2.30±0.20	2.23±0.20	2.23±0.20	2.23±0.20
28th	4.58±0.28	4.82±0.28	4.88±0.28	4.96±0.28
42th	5.02±0.32	5.31±0.32	5.40±0.32	5.52±0.32

Serum antibody titre against IBD virus based on HI Test in broiler chickens show significant ($P < 0.05$) difference between different treatment groups during 42nd 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 (T₃) 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 Shoeb *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 produced 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

- Cotter PF. Modulation of the immune response: Current perceptions and future prospects with an example from poultry. Pages 195–204 in *Biotechnology in the Feed Industry*. T. P. Lyons and K.A. Jacques, ed. Nottingham University Press, Nottingham, 1997.
- Raju MVLN, Devegowda G. Esterified-Gluco-mannan in broiler chicken diets-contaminated with aflatoxin, ochratoxin and T-2 toxin: Evaluation of its binding ability (in vitro) and efficacy as immunomodulator. *Asian-Aust. J Anim. Sci.* 2002; 15:1051-1056.
- Huang RL, Deng ZY, Yang C, Yin YL, Xie MY, Wu GY *et al.* Dietary oligochitosan supplementation enhances immune status of broilers. *J Sci. Food Agric.* 2007; 87:153-159.
- Gibson GR, Roberfroid B. Dietary modulation of the human colonic microbiota: Introducing the concept of prebiotics. *J Nutr.* 1995; 125:1401-1412.
- Shafey TM, Mufarej AS, Shalaby MI, Jarelnabi AJ. Effects of mannan oligosaccharides on antibody response to infectious bronchitis, infectious bursal disease and Newcastle disease in chickens. *J Appl. Anim. Res.* 2001; 19:117-127.
- Rui-Lin Huang, Zhe-Yuan Deng, Cheng-bo Yang, Yu-Long Yin, Ming Yong Xie, Guo-Yao Wu *et al.* Dietary oligochitosan supplementation enhances immune status of broilers. *J Sci Food Agric.* 2007; 87:153-159.
- Kim CJ, Namkung H, Ah MS, Paik IK. Supplementation of probiotics to the broiler diets containing mouldy corn. *Korean Journal of Animal Science.* 1988; 30:542-548.
- Zulkifli I, Abdullah N, Azrin MN, Ho YW. Growth performance and immune response of two commercial broiler strains fed diets containing *Lactobacillus* cultures and oxytetracycline under heat stress conditions. *Br. Poult. Sci.* 2000; 41:593-597.
- Abdel-Fattah SA, El-Sanhoury MH, El-Mednay NM, Abdel-Azeem F. Thyroid activity, some blood constituents, organs morphology and performance of broiler chicks fed supplemental organic acids. *Int. J Poult. Sci.* 2008; 7:215-222.
- Gong J, Forster RJ, Yu H, Chambers JR, Sabour PM, Wheatcroft R, Chen S. Diversity and phylogenetic, 2002.
- Jin Ho LAYW, Abdullah N, Jalaludin S. Growth performance, intestinal microbial populations, and serum cholesterol of broilers fed diets containing *Lactobacillus* cultures. *Poult. Sci.* 1997; 77:1259-1263.
- Shoeib HK, Sayed AN, Sotuhu SA, Ghaffer SKA. Response of broiler chicks to probiotics (Pronifer®) supplementation Assiut Vet. Med. J. 1997; 36:103-116. (CAB abstracts, 1997)
- Panda AK, Reddy MR, Praharaj NK. Dietary supplementation of probiotic on growth, serum cholesterol and gut microflora of broilers. *Indian. J Anim. Sci.* 2000; 71:488-490.
- Tannock GW, Munro K, Harmsen HJM, Welling G, Tannock W, Smart J *et al.* Analysis of the fecal microflora of human subjects consuming a probiotic containing *Lactobacillus rhamnosus* DR20. *Applied and Environmental Microbiology* 2001; 66:2578-2588.
- Kim GB, Seo YM, Kim CH *et al.* Effect of dietary prebiotic supplementation on the performance, intestinal microflora, and immune response of broilers. *Poult Sci* 2009; 90:75-82.
- Yin Y, Lei F, Zhu L *et al.* Exposure of different bacterial inocula to newborn chicken affects gut microbiota development and ileum gene expression. *ISME J.* 2008; 4:367-76.
- Woo KC, Jung BY, Lee MK, Paik IK. Effects of supplementary Safmannan (beta glucan and MOS) and World-Las (multiple probiotics) on the performance, nutrient availability, small intestinal microflora and immune response in broiler chicks. *Korean J Poul. Sci.* 2007; 33:151-158
- Rowghani E, Zamiri MJ. Effects of additives on chemical composition, degradability coefficients and ruminal intestinal disappearance of dry matter and crude protein of laboratory ensiled olive cake. *Iranian J Vet. Res.* University of Shiraz, 2007, 8(1).