



E-ISSN: 2320-7078

P-ISSN: 2349-6800

JEZS 2018; 6(3): 383-386

© 2018 JEZS

Received: 24-03-2018

Accepted: 25-04-2018

Indresh HC

Department of Poultry Science,
Veterinary College, KVAFSU,
Hebbal, Bangalore, Karnataka,
India

Jayanaik, Shivakumar MC

Department of Poultry Science,
Veterinary College, KVAFSU,
Hebbal, Bangalore, Karnataka,
India

Umashankar BC

Department of Poultry Science,
Veterinary College, KVAFSU,
Hebbal, Bangalore, Karnataka,
India

Narayanaswamy HD

Department of Poultry Science,
Veterinary College, KVAFSU,
Hebbal, Bangalore, Karnataka,
India

Munegowda T

Department of Poultry Science,
Veterinary College, KVAFSU,
Hebbal, Bangalore, Karnataka,
India

Correspondence**Indresh HC**

Department of Poultry Science,
Veterinary College, KVAFSU,
Hebbal, Bangalore, Karnataka,
India

Influence of feeding graded dietary levels of yeast cell extracted nucleotides (YEN) at different age intervals on serum biochemical profile of commercial broilers

Indresh HC, Jayanaik, Shivakumar MC, Umashankar BC, Narayanaswamy HD and Munegowda T

Abstract

The experiment was conducted at Department of Poultry Science Veterinary College, Bangalore during the month of July, 2016. The experiment was conducted to evaluate the influence of feeding graded levels of Yeast cell extracted nucleotide (YEN) at different age intervals on serum biochemical profile of commercial broilers. In a completely randomized design, 300 day-old straight run commercial broiler chicks were assigned to ten treatments with each treatments consisting of three replicates with ten chicks in each. Basal diet (control) T₁ was prepared without supplementation of yeast extracted nucleotides for day 1 to 42 days of experimental period. The birds in treatment groups T₂, T₃, T₄, T₅, T₆, T₇, T₈, T₉ and T₁₀ were fed with control diet supplemented with 1, 2 and 3 percent yeast extracted nucleotides, respectively for 14 days, 28 days and 42 days and rest of the period with control diet for remaining period upto 42 days. The highest serum protein level at the end of 14th day recorded T₃ (3.41%), albumin level T₃ (1.63%) and globulin level T₂ (1.80%). At the end of 28th and 42nd day the higher level of serum protein level recorded in group T₃ (3.08%), serum albumin level in group T₆ (1.35%) serum globulin level T₃ (1.77%). The results of feeding YEN on serum biochemical profile viz total protein, albumin and globulin shows that feeding graded levels of YEN upto 14 or 28 or 42 days with graded levels will not have any significant effect in the improvement of levels of serum total protein, albumin and globulin in commercial broilers.

Keywords: Yeast, nucleotides, total protein, albumin, globulin

Introduction

India stands 5th position in broiler production in the world (Economic survey, 2015-16). The major cost of production in poultry mainly depends on nutrition. Feed cost alone accounts for nearly 75 percent of the recurrent expenditure. Various methods and methodology has been employed to reduce the feed cost. Nutritionists have been searching for biological protein source to be included in the diets. Environmental management and appropriate nutrition during the first week of broiler life are critical to ensuring optimal performance, despite the fact that the quantity of feed used in this period comprises only 3.5% of total feed intake upto marketable age. Yet because neonatal chicks are unable to produce a complex of digestive enzymes, digestion is less than optimum^[1]. It is also during these same early days of life that birds face one of their most difficult physiologic transitions: the nutrient sources of lipid and protein in the embryo are replaced by the complex carbohydrates, proteins, and lipids in conventional starter diets. Yeast-derived products including β 1, 3-1, 6-glucan, mannan polysaccharides and nucleotides have been considered as one of the potential alternative supplements because of their growth promoting effects, immune modulatory and gut health maintaining properties^[2].

Nucleotides can be synthesized endogenously and are not considered as essential nutrients. However, the intestinal epithelium and lymphocytes of the gastrointestinal tract have rapid cell turnover and are unable to produce all the necessary nucleotides *de novo* to satisfy their own requirements^[3]. Therefore, intestinal development is highly dependent on the presence of dietary nucleotides. Dietary nucleotides have an essential role in the development and proliferation of tissues and cells with a rapid cell turnover such as the intestine and lymphocytes where *de novo* synthesis of nucleotides cannot meet their demand in such rapidly proliferating tissues.

The effect of feeding graded levels of yeast in the starter and finisher diets and observed that there were linear decreases in serum cholesterol and albumin of broilers fed graded levels of dietary yeast [4]. Similarly, noticed that inclusion of dietary yeast in broiler diets significantly decreased the serum triglycerides and increased serum concentrations of protein and globulin. They also opined that the Cholesterol, albumin, and PCV were significantly ($P \leq 0.05$) affected by dietary yeast supplementation [5]. The effect of dietary yeast culture (*Saccharomyces cerevisiae*) supplementation @ 1 and 2 percent on serum biochemistry and growth performance of Japanese quails. They observed that the blood plasma showed an improvement ($P < 0.05$) in total protein, albumin, globulin, GOT and GPT when birds were fed dietary yeast as compared to control [6].

The mean values of serum triglycerides, cholesterol, protein, uric acid, and the activities of aspartate amino transferase and alanine amino transferase were not affected by dietary yeast autolysate supplementation, and it was concluded that yeast autolysate caused no adverse effects on broilers [7]. It was noticed that no reduction in total white blood cells, serum profile levels and mean cell haemoglobin concentration with supplemental yeast fed to broilers [8].

Based on the above observations, it was hypothesized that yeast cell derived nucleotide could become a significant source of yeast components that can stimulate the serum biochemical profile viz serum total protein, albumin and globulin. Hence, the present study has been carried out to study the effect of feeding graded levels of yeast cell extracted nucleotides on serum biochemical profile viz serum total protein, albumin and globulin in broilers.

2. Materials and Methods

The present experiment was conducted at Department of Poultry Science, Veterinary College, Bangalore during July, 2016. Three hundred day-old straight run commercial broiler chicks were assigned to ten treatments with each treatments consisting of three replicates with ten chicks in each.

Basal diet (control) T₁ was prepared using corn and soya-bean meal as per the BIS (2007) standards (as per commercial requirement) without supplementation of yeast extracted nucleotides for day 1 to 42 days of experimental period. The birds in treatment groups T₂, T₃ and T₄ were fed with basal diet (control) supplemented with 1, 2 and 3 percent yeast extracted nucleotides, respectively from day 1 to 14 days and rest of the day upto 42 days basal diet (control) was fed. The birds in treatment groups T₅, T₆ and T₇ were fed with basal diet (control) supplemented with 1, 2 and 3 percent yeast extracted nucleotides, respectively from day 1 to 28 days and rest of the day upto 42 days basal diet (control) was fed. The birds in treatment groups T₈, T₉ and T₁₀ were fed with basal diet (control) supplemented with 1, 2 and 3 percent yeast extracted nucleotides, respectively from day 1 to 42 days (Table 1). Chemical composition of the yeast extracted nucleotides is provided in Table 3.4. All the birds were vaccinated against New castle disease and Infectious Bursal disease as per the schedule. Feed and water was provided ad libitum. Birds were reared on under standard managemental practices.

Blood samples were collected from two birds from each replicate in the treatment group from T₁ to T₄, T₁ to T₇ and T₁ to T₁₀ on 14th, 28th and 42nd day of experiment, respectively. About 2 ml of blood was collected from its wing vein and was transferred to a clean, sterilized and labelled test tube. The test tube was held in a slanting position to facilitate serum

separation. The separated serum was analysed for biochemical parameters like serum albumin, serum globulin and total protein. The blood was collected by wing vein and subjected to serum separation by centrifugation at 3333 rpm for 5 minutes. The samples were analysed for total protein, albumin and globulin levels using auto biochemical analyzer (Erba chem. -5 plus).

Table 1: Description of the dietary treatment and period of feeding

Treatment	Diet	Duration of treatment
T ₁	Control basal Diet	-----
T ₂	Control basal diet + 1% YEN	1-14 days
T ₃	Control basal diet + 2% YEN	1-14 days
T ₄	Control basal diet + 3% YEN	1-14 days
T ₅	Control basal diet + 1% YEN	1-28 days
T ₆	Control basal diet + 2% YEN	1-28 days
T ₇	Control basal diet + 3% YEN	1-28 days
T ₈	Control basal diet + 1% YEN	1-42 days
T ₉	Control basal diet + 2% YEN	1-42 days
T ₁₀	Control basal diet + 3% YEN	1-42 days

3. Statistical Analysis

The design of the experiment is complete randomized design (CRD) with one way analysis. The data pertaining to serum biochemical profile were analyzed by standard procedure described by Snedecor and Cochran (1980) and by using SPSS 20 statistical software. Differences between the means were tested using Tukey's Range Test at $P \leq 0.05$.

4. Result and Discussion

The results of the effect of feeding graded levels of yeast cell extracted nucleotides (YEN) on Serum biochemical profile (g/dl or %) viz total protein, albumin and globulin during 14th, 28th and 42nd day in commercial broiler are presented in Table 2, 3 and 4, respectively.

At the end of 14th day, the serum total protein level (g/dl or %) in group T₁, T₂, T₃ and T₄ were 3.31, 3.39, 3.41 and 3.27, respectively. The serum albumin level in group T₁, T₂, T₃ and T₄ were 1.58, 1.59, 1.63 and 1.56, respectively. The serum globulin level in group T₁, T₂, T₃ and T₄ were 1.72, 1.80, 1.78 and 1.70, respectively. The results of the feeding graded levels of yeast cell extracted nucleotides on serum biochemical profile (g/dl or %) viz total protein, albumin and globulin in commercial broilers at 14th day showed that no significant ($P \geq 0.05$) difference in serum total protein, albumin and globulin levels among control group (T₁) and 1, 2, 3 percent YEN groups (T₂, T₃ and T₄). Even there was no much numerical difference in the level of serum biochemical profile among various levels of YEN and also with control group. It shows that feeding graded levels of YEN upto 14 days will not have any significant effect in the improvement of levels of serum total protein, albumin and globulin in commercial broilers.

Table 2: Effect of feeding graded levels of yeast cell extracted nucleotides on Serum biochemical profile (g/dl or %) at the 14th day in commercial broilers.

Experimental Group	Total protein	Albumin	Globulin
T ₁	3.31 ± 0.18	1.58 ± 0.17	1.72 ± 0.33
T ₂	3.39 ± 0.25	1.59 ± 0.15	1.80 ± 0.23
T ₃	3.41 ± 0.30	1.63 ± 0.20	1.78 ± 0.21
T ₄	3.27 ± 0.40	1.56 ± 0.20	1.70 ± 0.20

At the end of 28th day, the serum total protein level (g/dl or %) in group T₁, T₂, T₃, T₄, T₅, T₆ and T₇ were 3.03, 3.06, 3.08, 3.04, 3.01, 3.05 and 3.05, respectively. The serum albumin level in group T₁, T₂, T₃, T₄, T₅, T₆ and T₇ were 1.29, 1.31, 1.30, 1.29, 1.28, 1.35 and 1.33, respectively. The serum globulin level in group T₁, T₂, T₃, T₄, T₅, T₆ and T₇ were 1.73, 1.74, 1.77, 1.74, 1.73, 1.69 and 1.72, respectively. Statistical analysis revealed no significant difference in serum globulin level among the various treatment groups and also compared to control. The results at the end of 28th day, revealed that no significant ($P \geq 0.05$) difference in serum total protein, albumin and globulin levels among control group (T₁), 1, 2, 3 percent YEN groups (T₂, T₃ and T₄) fed upto 14 days and 1, 2, 3 percent YEN (T₅, T₆ and T₇) fed upto 28 days. The levels of serum total protein, albumin and globulin will not show much difference in different levels of YEN fed for different periods (14 days or 28 days), which shows that feeding graded levels of YEN upto 14 or 28 days with graded levels will not have any significant effect in the improvement of levels of serum total protein, albumin and globulin in commercial broilers.

Table 3: Effect of feeding graded levels of yeast cell extracted nucleotides (YEN) on Serum biochemical profile (g/dl or %) at the 28th day in commercial broilers.

Experimental Group	Total protein	Albumin	Globulin
T ₁	3.03 ± 0.19	1.29 ± 0.12	1.73 ± 0.17
T ₂	3.06 ± 0.21	1.31 ± 0.12	1.74 ± 0.18
T ₃	3.08 ± 0.28	1.30 ± 0.14	1.77 ± 0.23
T ₄	3.04 ± 0.20	1.29 ± 0.11	1.74 ± 0.10
T ₅	3.01 ± 0.24	1.28 ± 0.06	1.73 ± 0.18
T ₆	3.05 ± 0.24	1.35 ± 0.11	1.69 ± 0.15
T ₇	3.05 ± 0.27	1.33 ± 0.10	1.72 ± 0.23

At the end of 42nd day, serum total protein level (g/dl or %) in group T₁, T₂, T₃, T₄, T₅, T₆, T₇, T₈, T₉ and T₁₀ were 3.09, 3.11, 3.14, 3.18, 3.10, 3.13, 3.15, 3.10, 3.12 and 3.14, respectively. The serum albumin level in group T₁, T₂, T₃, T₄, T₅, T₆, T₇, T₈, T₉ and T₁₀ were 1.35, 1.32, 1.39, 1.34, 1.38, 1.37, 1.31, 1.39, 1.33 and 1.39, respectively. The serum globulin level in group T₁, T₂, T₃, T₄, T₅, T₆, T₇, T₈, T₉ and T₁₀ were 1.73, 1.78, 1.75, 1.83, 1.72, 1.76, 1.84, 1.70, 1.79 and 1.75, respectively. The serum total protein, albumin and globulin levels on 42nd day showed that no significant difference in serum total protein, albumin and globulin levels among control group (T₁), 1, 2, 3 percent YEN groups (T₂, T₃ and T₄) fed upto 14 days, 1, 2, 3 percent YEN (T₅, T₆ and T₇) fed upto 28 days and 1, 2, 3 percent YEN (T₈, T₉ and T₁₀) fed upto 42nd day, which shows that feeding graded levels of YEN upto 14 or 28 or 42 days with graded levels will not have any significant effect in the improvement of levels of serum total protein, albumin and globulin in commercial broilers.

The study results are in agreement with findings of ⁽⁷⁾ who observed that dietary yeast autolysate supplementation will not have any effect on serum triglycerides and protein levels in broilers. Similarly ⁽⁸⁾, observed that that there was no reduction in total white blood cells, mean cell haemoglobin concentration and total protein level with supplemental yeast fed to broilers.

The results of the present study was in contrary with ⁽⁵⁾ who noticed that inclusion of dietary yeast in broiler diets significantly decreased the serum triglycerides and increased serum concentrations of protein and globulin. Similarly ⁽⁴⁾, concluded that the effect of feeding graded levels of yeast in the starter and finisher diets, there was a linear decrease in serum cholesterol and albumin of broilers fed graded levels of

dietary yeast. The present results are in contrary with ⁽⁶⁾ observed that the blood plasma showed an improvement ($P < 0.05$) in total protein, albumin, globulin levels in quail birds fed with different levels of dietary yeast compared to control diet.

Table 4: Effect of feeding graded levels of yeast cell extracted nucleotides on serum biochemical profile (g/dl or %) at the 42th day in commercial broilers.

Experimental Group	Total protein	Albumin	Globulin
T ₁	3.09 ± 0.30	1.35 ± 0.11	1.73 ± 0.20
T ₂	3.11 ± 0.17	1.32 ± 0.11	1.78 ± 0.09
T ₃	3.14 ± 0.16	1.39 ± 0.08	1.75 ± 0.11
T ₄	3.18 ± 0.14	1.34 ± 0.13	1.83 ± 0.07
T ₅	3.10 ± 0.09	1.38 ± 0.13	1.72 ± 0.18
T ₆	3.13 ± 0.17	1.37 ± 0.10	1.76 ± 0.11
T ₇	3.15 ± 0.15	1.31 ± 0.06	1.84 ± 0.09
T ₈	3.10 ± 0.10	1.39 ± 0.11	1.70 ± 0.10
T ₉	3.12 ± 0.10	1.33 ± 0.08	1.79 ± 0.04
T ₁₀	3.14 ± 0.19	1.39 ± 0.16	1.75 ± 0.09

5. Conclusion

Based on the present experiment result it was concluded that feeding graded levels of YEN upto 14 or 28 or 42 days will not have any significant effect in the improvement of levels of serum total protein, albumin and globulin in commercial broilers.

6. Acknowledgement

Authors are thankful to The Head of the Poultry Science department, Veterinary College, Bangalore for providing the necessary facilities and support for carrying out the study successfully.

7. References

1. Lesson S, Summers JD. Commercial poultry Nutrition. 3 rd Ed. University Books, Guleph, Ontario, Canada, 2005.
2. Brümmer M, Jansen Van Rensburg C, Moran C. *Saccharomyces cerevisiae* cell wall products: the effects on gut morphology and performance of broiler chickens. South African J of Anim. Sci. 2010; 40:14-21.
3. Li P, Burr GS, Goff J, Whiteman KW, Davis KB, Vega RR *et al.* A preliminary study on the effects of dietary supplementation of brewer's yeast and nucleotides, singularly or in combination, on juvenile red drum (*Sciaenops ocellatus*). Aquacult. Res. 2005; 36:1120-1127.
4. Ahmed ME, Talha Abbas E, Mojahid Abdhag A, Dafaalla Mukhtar E. Effect of Dietary Yeast (*Saccharomyces cerevisiae*) Supplementation on Performance, Carcass Characteristics and Some Metabolic Responses of Broilers. J Anim. and Vet. Sci. 2015; 3(5-1):5-10.
5. Paryad A, Mahmoudi M. Effect of different levels of supplemental yeast (*Saccharomyces cerevisiae*) on performance, blood constituents and carcass characteristics of broiler chicks. Afr. J Agric. Res, 2008; 12:835-842.
6. Ghally KA, Latif SA. Effect of dietary yeast on some productive and physiological aspects on growing Japanese quails. African Crop Science Conference Proceeding. 2007; 8:2147-2151.
7. Yalcin S, Eser H, Yalcin S, Cengiz S, Eltan O. Effects of dietary yeast autolysate (*Saccharomyces cerevisiae*) on performance, carcass and gut characteristics, blood

profile, and antibody production to sheep red blood cells in broilers. J Appl. Poult. Res, 2013; 22:55–61.

8. Shareef, A.M. and Al-Dabbagh, A.S.A. Effect of probiotic (*Saccharomyces cerevisiae*) on performance of broiler chicks. Iraqi J Vet. Sci, 2009; 23 (1):23–29.