Effect of Supplementation of Experimental Growth Promoters on Broiler Growth Performance

Hrangkhawl T1, Mukhopadhayay SK2*, Niyogi D3 and Ganguly S3

1Department of Veterinary Pathology, Faculty of Veterinary & Animal Sciences, West Bengal University of Animal and Fishery Sciences, Kolkata 700 037, WB, India
2Department of Veterinary Pathology, College of Veterinary Science & Animal Husbandry, Narendra Deva University of Agriculture and Technology, Faizabad 224 229, UP, India
3AICRP-PHT (ICAR), Department of Fish Processing Technology, Faculty of Fishery Sciences, West Bengal University of Animal and Fishery Sciences, Kolkata 700 094, WB, India

Abstract

The present study was conducted to study the effect of mannan oligosaccharide and dietary organic acid supplements on body weight of broiler chicks. The present investigation showed better growth performance in combination with organic acid salts in terms of body weight. It was found that mean villus length increased significantly (P<0.01) in the treatment groups rather than the control birds.

Keywords: Body weight; Organic acid; Villus length

Introduction

The present study was conducted on 120 no. day old unisex Vencobb-400 broiler chicks which were divided into six groups consisting of 20 chicks in each group and one group was kept as Control in which the diet was free of acidifier, growth promoter and OA. The feeding and watering troughs were clean and disinfected. The cages in which the diet was free of acidifier, growth promoter and OA. The cages in which the diet was free of acidifier, growth promoter and OA. The cages in which the diet was free of acidifier, growth promoter and OA. The cages in which the diet was free of acidifier, growth promoter and OA.

Materials and Methods

The experiment was conducted on 120 no. day old unisex Vencobb-400 broiler chicks which were divided into six groups consisting of 20 chicks in each group and one group was kept as Control in which the diet was free of acidifier, growth promoter and OA. The feeding and watering troughs were clean and disinfected. The cages were fumigated with formaldehyde and KMnO4 (2:1) three days prior to arrival of chicks. The cages were kept dry, clean, disinfected and well ventilated during the entire experimental periods. One hundred and twenty day-old Vencobb-400 unsexed/straight broiler chicks after weighing were randomly distributed into six groups, each group having 20 birds were subdivided into four replicates and placed in separate battery brooders. One group was maintained as control and other 5 groups were maintained as treatment groups as given in table 1.

The experimental chicks were maintained under standard conditions of feeding and management.

Table 1: Distribution of experimental groups.

| S.No | Group | Mark | Diet |
|------|-------|------|------|
| 1.   | Control | C    | Control diet without acidifier, growth promoter and organic acids. |
| 2.   | Treatment-1 T1 |   | Diet with Ammonium formate (0.15%)+Calcium propionate (0.15%)+MOS (2 gm/kg) |
| 3.   | Treatment-2 T2 |   | Diet with Formic acid (0.1%)+Propionic acid (0.1%)+Lactic acid (0.1%) |
| 4.   | Treatment-3 T3 |   | Diet with Ammonium formate (0.15%)+Calcium propionate (0.15%). |
| 5.   | Treatment-4 T4 |   | Diet with Lactic acid (0.1%)+Formic acid (0.1%)+Propionic acid (0.1%)+Activated charcoal (0.1%). |
| 6.   | Treatment-5 T5 |   | Diet with Bacitracine Methylen disalicylate (BMD). |

Results and Discussion

Effect of feeding organic acids and mannan oligosaccharide on body weight (in gm) of broiler chicks.

Average body weight of individual birds of each group were recorded at day 1 and repeated at every 10 days interval till 42 days of age. The highest body weight was observed in group T1 followed by T3, T2 and T4 respectively at 4 weeks age. On statistical analysis no significant difference was observed between different treatment groups. At the end of the experimental period significantly higher body weight was recorded in T1, T2 and T3 groups compared to the other groups (Table 2).

Table 2: Effect of feeding organic acids and mannan oligosaccharide on body weight.

| S.No | Group | Mark | Diet | SEM |
|------|-------|------|------|-----|
| 1.   | Control | C    | Control diet without acidifier, growth promoter and organic acids. | 3.760 |
| 2.   | Treatment-1 T1 |   | Diet with Ammonium formate (0.15%)+Calcium propionate (0.15%)+MOS (2 gm/kg) | 3.760 |
| 3.   | Treatment-2 T2 |   | Diet with Formic acid (0.1%)+Propionic acid (0.1%)+Lactic acid (0.1%) | 8.003 |
| 4.   | Treatment-3 T3 |   | Diet with Ammonium formate (0.15%)+Calcium propionate (0.15%). | 10.319 |
| 5.   | Treatment-4 T4 |   | Diet with Lactic acid (0.1%)+Formic acid (0.1%)+Propionic acid (0.1%)+Activated charcoal (0.1%). | 12.002 |
| 6.   | Treatment-5 T5 |   | Diet with Bacitracine Methylen disalicylate (BMD). | 10.319 |

Values bearing at least one common superscript within the row did not differ significantly (P>0.05).

Received March 04, 2013; Accepted April 25, 2013; Published April 27, 2013

Citation: Hrangkhawl T, Mukhopadhayay SK, Niyogi D, Ganguly S (2013) Effect of Supplementation of Experimental Growth Promoters on Broiler Growth Performance. Adv Pharmacoepidemiol Drug Safety 2: 131. doi: 10.4172/2167-1052.1000131

Copyright: © 2013 Hrangkhawl T, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.
Table 3: Effect of treatments on the villus length (mm) of different portions of small intestine of broiler chicken at 42 days.

| Portion of intestine | Control T1 | T2 | T3 | T4 | SEM |
|----------------------|------------|----|----|----|-----|
| Duodenum             | 841.5a     | 1379.2a | 1477.2a | 1038b | 1357.5a | 1269.5b | 10.783 |
| Jejunum              | 786.5a     | 1015.9a | 1137.4a | 1014.9a | 1243.9a | 1167.3a | 11.508 |
| Ileum                | 731.5a     | 1025.5a | 1057.4a | 883.4a | 1082.3a | 1053.2a | 7.979 |

T: Treatment groups
Values bearing at least one common superscript within the row did not differ significantly (P>0.05).

Effect on villus length of different portions of intestine

Birds were sacrificed from each group at 42 days age and their intestines were taken for slide preparation. Slides were prepared by sectioning and staining the tissues from duodenum, jejunum and ileum [11]. The lengths of the intestinal villi were measured by ocular micrometer under 10X objective of microscope. Average of ten readings was taken from each part of intestine. The reading obtained from ocular micrometer was multiplied by conversion factor derived from stage micrometer. Then the lengths of the intestinal villi were expressed as millimeter (mm) and the lengths were converted into micron (μ) value. On statistical analysis, significantly (P<0.01) higher values were observed in treatment groups when compared with control group. Highest villus length in duodenum was observed in T1, then followed by T3, T4, T5 and T6 and but there was no significant between T7 and T4 (Table 3).

These findings also in lineage with earlier report [9]. Higher villus height in duodenum, jejunum in small intestine was reported with most organic acidifier in diet of broiler [12]. Again it was reported higher villus height in the ileum with the diet based on organic acidifier compared with diet fed without MOS+organic acidifier [13]. It increases villus height and function of secretion, digestion and absorption of nutrients can be appropriately performed by the mucosa [14].

Conclusion

Supplementation of organic acidifier proves to be a better growth promoter in combination with organic acid salts. It also shows increase in villus height of different parts of small intestine helpful for better absorption and digestion of feed in the gut. So, organic acidifier reduces the growth of many pathogenic and non-pathogenic intestinal bacteria, decreases intestinal colonization and reduces infections process, ultimately decreasing inflammatory process at the intestinal mucosa.

Acknowledgement

The authors are thankful to the Vice-Chancellor, West Bengal University of Animal and Fishery Sciences for providing the necessary facilities to carry out the research work.

References

1. Schultz-Mosgau S, Zielinski T, Lochner J (2004) Web-based, virtual course
2. Duncan DB (1955) Multiple range and multiple F tests. Biometrics 11: 1-42.
3. Izat AL, Adams MH, Cabel MC, Colberg M, Reiber MA, et al. (1990) Effects of formic acid or calcium formate in feed on performance and microbiological characteristics of broilers. Poult Sci 69: 1876-1882.
4. Kaniawati S, Skinner JT, Waldroup PW, Izat AL, Colberg M (1992) Effects of feeding organic acids to broilers on performance and salmonella Colonization of the caeca and or contamination of the carcass. Poult Sci 71 (Suppl 1): 159.
5. Visek WJ (1978) The mode of growth promotion by antibiotics. J Anim Sci 48: 1447-1489.
6. Pelicano ERL, Souza PA, Souza HBA, Figueiredo DF, Boliago MM, et al. (2005) Intestinal mucosa development in broiler chicken fed natural growth promoters. Revista Brasileira de Ciencia Avicola 7:4.
7. Podolsky DK (1993) Regulation of intestinal epithelial proliferation: a few answers, many questions. Am J Physiol 264: G179-186.
8. Lille RD (1965) Histopathological Technique and Practical Histochemistry. (3rd edn). p.117. McGraw Hill Book Company: New York.
9. Loddi MM, Nakaghi ISO, Edens F, Tucci FM, Hammas MI, et al. (2004) Mannan-oligosaccharide and organic acids on performance and intestinal morphometric characteristics on broiler chickens. In Proceeding of the 20th Annual Symposium (Suppl 1): 45.
10. Savage TF, Zakrzewska EI, Andreasen JR (1997) The effects of feeding mannan-oligosaccharide supplemented diet to poultry on performance and the morphology of small intestine. Poult Sci 76 (Suppl 1): 139.
11. Iji PA, Tivey DR (1998) Natural and Synthetic oligosaccharides in broiler chicken diets. World’s Poult Sci 54: 129-143.