

Title *Evaluation of Comparative Effects of Zinc Bacitracin, Lactobacillus and Mannan Oligosaccharide on Morphometric Characteristics of Tibia Bone in Broilers*

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Abstract:

Background

Bone is metabolically self-motivated organ and it undertakes continuous remodeling. Skeleton provides structural support to the birds and serves as an important source of minerals like phosphorus and calcium. Bone strength and hardness is due to organic and inorganic sources. Bone mineralization is directly related to the bone density. Bone weakness is an important skeletal problem which causes economic losses in poultry industry. Leg bone deformities adversely affect the bird's performance. Antibiotics and its alternatives like probiotics and prebiotics in the feed have beneficial effect on bone health and bone quality in broilers. The objective of the present study was to evaluate the comparative effects of antibiotic, probiotic and prebiotic on morphometric characteristics of tibia bone in broilers.

Materials and Methods

160 one day old broiler chicks were reared under environmentally controlled conditions. The chicks were randomly divided into four groups with four replicates. Group I was served as control and fed only basal diet. Group II was given BD + 0.04% Zn bacitracin, group III was given BD + 0.1% lactobacillus based probiotic and group IV was given BD + 0.1% mannan oligosaccharide. On day 35, two birds from each replicate were slaughtered. Blood samples were collected for determination of serum ALP level. Right and left tibia of each bird was separated and immersed in boiling water (100°C) for 10 minutes. Specimens were cooled at room temperature. Flesh was removed from each bone. After this, bone weight and bone length was measured. Diaphysis diameter and medullary canal diameter was measured with digital caliper. Dry tibia bones were burnt in a muffle furnace at 560°C for 24 hours to calculate the % ash bone ash.

Results

The results revealed that tibia bone weight, length, thickness of medial wall and lateral wall, % bone ash and tibiotarsal index of broilers supplemented with zinc bacitracin, lactobacillus based probiotic and mannan oligosaccharide presented the significant values ($P < 0.05$) as compared to the control group. However, weight/length of bone index of broilers supplemented with lactobacillus based probiotic and mannan oligosaccharide presented the higher values ($P < 0.05$) than the control and zinc bacitracin supplemented groups. Medullary canal diameter of control group was higher ($P < 0.05$) than all the supplemented groups. Diaphysis diameter and robusticity index presented the no significant difference between the control group and all supplemented groups. Between different supplemented groups, tibia bone weight and weight/length index of broilers supplemented with lactobacillus based probiotic were significantly higher ($P < 0.05$) than the zinc bacitracin supplemented group. Serum alkaline phosphatase level of all supplemented groups was lower than the control group.

Conclusion

It is concluded that antibiotics, probiotics and prebiotics improve the bone morphometric characteristics, bone density and bone quality in broilers.
