

The effect of *Bacillus subtilis* based probiotic on bone health in broiler chickens

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Introduction:

Some probiotics have been reported to regulate bone health in humans and various animal models. The objective of this study was to determine the effect of dietary supplementation of a *Bacillus subtilis* based probiotic on broiler bone health.

Material and Methods:

One hundred and twenty 1-d-old Ross 708 broilers were assigned to 24 floor pens based on their body weights. The broilers were fed either a basal diet or the basal diet mixed with a commercial *Bacillus subtilis* based probiotic product (250ppm, 1×10^6 cfu/g of feed) for 6 wks (n=12). Room temperature was gradually decreased from 35°C on d 1 to 21°C by 0.5°C/day, and maintained at 21°C for the rest of the experimental period. At d 43, the tibias and femurs were collected for mineral content and morphometric characteristic analyses; serum was collected for determining the levels of osteocalcin, cross-linked C-terminal telopeptide of type I collagen (CTX), calcium, and phosphorus. Latency to lie (LTL) as a leg strength indicator was performed at d 44. Data were subjected to an ANOVA of SAS (9.4). Tukey-kramer test was used for comparison.

Results:

Compared to controls, the tibias and femurs of probiotic fed broilers had significantly greater mineral density, mineral content, wall thickness, mineral area, length, width, and weight ($P < 0.05$). In addition, broilers fed with the probiotic had a trend to have lower serum CTX levels ($P = 0.08$), a bone resorption indicator. Serum osteocalcin, calcium, and phosphorus levels as well as leg strength were not affected by the dietary probiotic supplementation. These results indicate that dietary supplementation of *Bacillus subtilis* based probiotic has a significant improvement on broiler bone health, and this effect may be via down regulating bone resorption. Dietary probiotic supplementation may be a management strategy for improving skeletal health and welfare in broiler chickens.

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