

463P Comparison of bone mineralization measured by dual energy X-ray absorptiometry and tibia and toe bone characteristics in broilers fed varying dietary calcium and non-phytate phosphorus levels. Anne-Sophie Valable*^{SC,1,2}, Agnès Narcy², Michel Duclos², Greg Page³, and Marie-Pierre Letourneau-Montminy¹, ¹Laval University, Quebec, QC, Canada, ²INRA Poultry Research unit, Nouzilly, France, ³Trouw Nutrition Agresearch, Guelph, ON, Canada.

Different bones and criteria can be used to assess bone mineralization. Whole body bone mineral content (BMC) was compared with tibia ash weight and breaking strength (BS) and toe ash weight. A total of 3,600 Ross 708 broilers were randomly divided into each of 10 replicate pens of 6 dietary treatments. Broilers were fed a common starter diet from d0 to d10. From d 10 to d 21, broilers were fed a positive control (C+: 0.90% Ca, 0.39% nPP), a negative control (C-: 0.71% Ca, 0.35% nPP) or a low Ca and nPP diet (L: 0.60% Ca, 0.30% nPP). From d 21 to d 37, the levels in C+, C- and L diets were respectively 0.85, 0.57 and 0.48% Ca and 0.35, 0.29 and 0.24% nPP. Six dietary sequences were tested: C+C+, C-C-, LC+, LC-, C-L and LL. At d 21 and d 37, 10 birds per treatment were slaughtered, frozen at -20°C and scanned with dual energy x-ray absorptiometry (DXA) to estimate whole-body BMC. Tibia and toe were then collected to assess ash weight and tibia BS. Pearson's regression analysis was performed to predict whole-body BMC based on other bone criteria as well as the effect of dietary treatments on this relation. For both phases (d10 to d21 and d21 to d37), BMC was best correlated with tibia ash weight (74 and 85%, $P < 0.001$) followed by toe ash weight (50 and 68%, $P < 0.001$) and BS (37 and 51%, $P < 0.01$). Accordingly, BMC was better predicted by tibia ash weight (d 21 and d 37, $R^2 = 55$ and 73%), than toe ash weight (d 21 and d 37, $R^2 = 31$ and 53%) or BS (d 21 and d 37, $R^2 = 25$ and 41%). Dietary treatments influenced the intercept of the relation between BMC and BS at d 21 and d 37 ($P = 0.02$ and $P < 0.01$), and that of BMC and toe ash weight at d 37 ($P = 0.01$), but not the slope. The correlation improved with increasing body weight (age). In conclusion, tibia ash weight appeared to be a strong predictor of whole-body bone mineralization in broiler

Key Words: bone mineralization, bone ash, dual energy X-ray absorptiometry, bone strength, broiler