

413P Impact of water acidifiers type and dietary calcium and phosphorus on growth performance and bone mineralization in broilers

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Acidification of drinking water is used as an alternative to growth-promoting antibiotics. Antimicrobial properties of certain acids, their ability to lower the pH of drinking water and the buffering capacity of feed are linked with a beneficial effect on the physiology of gastrointestinal tract. The objective of this study was to test the impact of different type of water acidifiers: 1) no acidification, 2) Inorganic acidifier (INORGACID; phosphoric acid) and 3) organic acidifiers (ORGACID; mix) in a normal (NCaP) or in a sub-limiting Ca and P diet (LowCaP; -15% Ca and P). Level of inclusion of acidifying agents varied according to the target pH of the water (5.8). A total of 2700 one-day-old male broilers (Ross 308) were randomly assigned to the 6 treatments, with 10 replicates of 45 chicks per replicate for 3 growing phases (0-10, 11-21 and 22-30 days). Growth performances were determined in each phase. Water consumption was measured daily by pen. On day 10, 21, and 30, a blood sample was collected on 1 bird per pen (n=60) before slaughter for DXA scan measurements to obtain bone mineral content (BMC) as well as fat and lean mass. Results showed a decrease in average daily gain (ADG; -5%) and body weight (BW -7%) and a tendency for plasma Ca in LowCaP diet during the starter diet only when broilers received ORGACID (Water x CaP; P=0.016, 0.031, 0.07 respectively). Daily water consumption (DWC) tended to be decreased in LowCaP diet without effect on average daily feed intake (ADFI; P=0.06). Bone mineral content (BMC) was decreased in LowCaP diet only when broilers received INORGACID (Water x CaP; P=0.047). Similar results were obtained during the grower phase with ORGACID in which birds tend to be affected more from the LowCaP in terms of final BW, ADFI and FCR (Water x CaP; P=0.06, 0.08, 0.07 respectively). The BMC and plasma P were reduced in LowCaP diet during grower phase (-15% and -16%; CaP, P<0.001). During the finisher phase, ORGACID-NCaP consumed more than ORGACID-LCaP (Water x CaP; P=0.05). Also, LCaP have a lower impact (-10%) on BMC/BW with INORGACID than ORGACID (-18%) and no acidification (-28%; Water x CaP; P=0.05) and plasma P was reduced in LCaP (-12%; P<0.001). The evolution of BMC over time showed that birds receiving INORGACID did not have a reduced BMC when fed a LCaP diet at day 30 (Time x CaP x Water; P<0.001). Therefore, the P supply by INORGACID (phosphoric acid) was sufficient to cope the dietary Ca and P reduction effect on bone mineralisation. Nevertheless, the water acidifiers tested did not improved growth performance and we have even seen a reduction with ORGACID in LCaP. Further studies are needed to understand their effects and optimize water acidification practices.

Key Words: bone; broiler; calcium; phosphorus; acidifiers