EFFICACY AND METABOLISM OF SUPPLEMENTARY Guanidinoacetic acid in broilers subjected to heat stress

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Guanidinoacetic acid (GAA) is approved to spare arginine and serve as a precursor of creatine (Cr). We hypothesized that supplementation with GAA enhances muscle Cr and phosphocreatine (PCr) levels, hence supports cellular energy status and benefits heat stressed broilers. A total of 720 one-day-old male Ross 308 broilers were allocated to 3 treatments with 12 replicates (20 birds each). Treatments were 0, 0.6 or 1.2 g/kg GAA added to a corn/SBM diet and fed for 39d. Chronic cyclic heat stress (34°C/ 50-60% rh for 7h daily) was applied during the finisher phase (d25-39). Body weight and feed consumption were determined after the starter, grower and finisher phase. One bird per pen was sampled on d26 (acute) and d39 (chronic heat stress) to examine physiological traits of Cr, PCr and ATP in breast muscle, and GAA and Cr in blood and liver. 0.12% GAA improved feed conversion by 3 points during d0-25 and even 9 points in the heat stressed finisher phase whilst final body weight remained unchanged. Increasing GAA supplementation elevated Cr levels in blood, liver and muscle at d26 and d39. Except liver Cr, levels were generally lower at d39 compared to d26 in blood, liver and muscle. However, in contrast, higher PCr levels were found at d39 compared to d26. We conclude that chronic heat stress may negatively affect endogenous GAA and creatine availability in broilers but muscle PCr levels are increased. Dietary GAA significantly improved cellular energy supply and performance in broilers exposed to chronic heat stress.