

## Guanidinoacetic Acid and Woody Breast

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Woody breast is characterized by a thickening of the breast muscle, myodegeneration, lipid infiltration, inflammation of the tissue, and increased collagen deposition. When severe, these changes result in a texture which many consumers find objectionable (Che et al., 2022). These changes also cause problems with further processing including increased drip-loss, increased cooking-loss, poor cohesion of formed meat products, and inconsistent horizontal slicing of breast filets. While moderately affected product can follow normal product channels, severely affected breast meat must be identified and segregated for additional handling. This could mean trimming, blending with normal product, and diversion into lower end brands or alternative markets like pet treats.

Che and coworkers estimated that at least 10% of breast filets exhibit severe Woody breast. Furthermore, these researchers found a positive correlation between body weight, breast filet weight, and yield versus Woody breast severity. Taken together, these conclusions suggest that the incidence of severe Woody breast among heavy birds must be well in excess of 10%. Dr. Casey Owens, University of Arkansas, observed that processing plants with slaughter weights above 8 pounds (3.6 kg) may experience severe Woody breast at rates as high as 20% (Alonzo et al, 2022). Dr. Parker Hall of Perdue Foods presented data in the PSA Fall Webinar 2022 showing an average incidence of 0.4% of severe Woody breast in retail breast meat collected from the market (Hall, 2022). It is reasonable, then, to estimate that more than 19% of breast meat from large bird complexes is being diverted from sale as breast meat due to the presence of severe Woody breast. The USDA Market News Report for November 6, 2023 shows that 56% of all broilers processed under federal inspection exceeded 6.25 pounds (2.8 kg) of body weight. Of these heavy birds, 57% were above 7.75 pounds (3.5 kg) of body weight.

Feed restriction, formulating feeds to a lower nutrient density, and feeding for slow growth have been shown to reduce the severity of Woody breast (Simoes et al., 2020). Economics, however, generally favor faster growth rates and larger birds.

While no nutritional strategy has been shown to eliminate Woody breast, guanidinoacetic acid (GAA) has been shown to significantly reduce the severity of this myopathy. Moderately affected breast meat can often follow normal channels for breast meat sales. Limiting the severe occurrences of Woody breast may be the best alternative to total elimination of the myopathy.

In one of the first published trials of the effects of GAA on Woody breast, Cordova-Noboa et al. (2018) fed diets with or without 0.06% GAA to Ross 708 male broilers to 55 days of age. Average processing weights were approximately 5 kg. Birds fed diets containing GAA without poultry by-product had significantly improved FCR and lower (better) Woody breast scores compared to those not fed GAA. GAA birds were about twice as likely to receive a Woody breast score of 2 (mild) compared to birds not fed GAA.

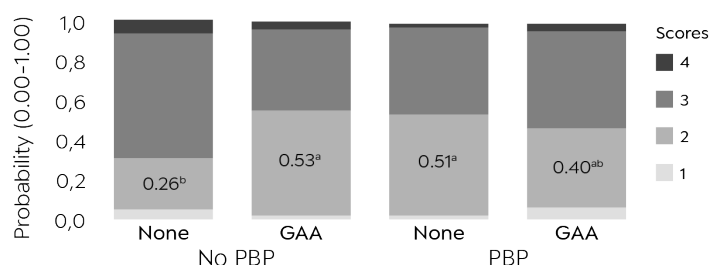


Figure 1. Woody breast scores of broilers fed 0.00% or 0.06% GAA with or without poultry by-product (PBP) meal. Cordova-Noboa et al., 2018, modified

More recently, Maynard et al. (2023a) fed Ross 708 males diets containing 0.00%, 0.06% or 0.12% GAA from Creamino®. Birds were processed at 55 d of age. GAA at either

0.06% or 0.12% improved FCR (P<0.05). Woody breast scores were improved numerically with the addition of 0.06% of GAA and reached statistical significance at the 0.12% level of GAA (Control, 1.38; 0.06%, 1.17; 0.12%, 1.05).

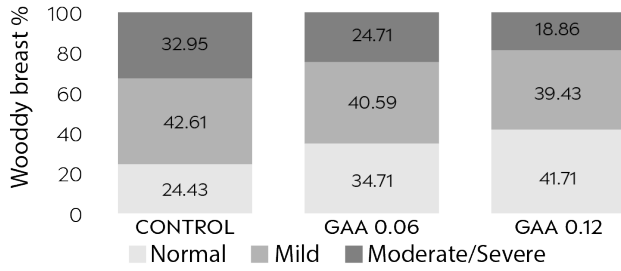


Figure 2. Proportion of Woody breast samples scoring normal, mild or moderate/severe versus GAA level in the diet. Maynard et al., 2023a, Modified

In a follow-up study Maynard et al. (2023b) investigated the effects of reduced dietary energy (AMEN) and GAA supplementation in Ross 708 male broilers. Treatments included a Positive Control diet (PC), a Negative Control diet (NC) with

a 110 kcal/kg energy reduction, and diets with GAA at 0.08% with either a 55 kcal/kg or a 110 kcal/kg energy reduction versus the PC. Birds fed the NC were able to compensate for the caloric reduction by increasing their feed intake resulting in an increased FCR relative to the PC and -55 kcal+GAA treatments. FCR for the -110 kcal+GAA was intermediate.

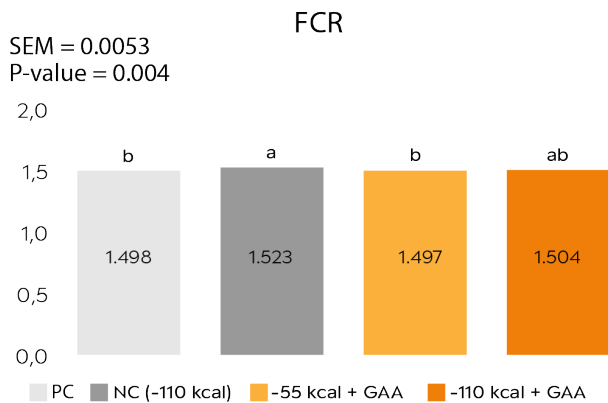


Figure 3. FCR by treatment. Maynard et al., 2023b, modified

GAA treatments produced Woody breast scores of mild to moderate for 82.70% (-55 kcal + GAA) and 82.05% (-110 kcal + GAA) of the breast filets compared to 76.92% (PC) and 72.44% (NC) of breast filets from the non-GAA treatments.

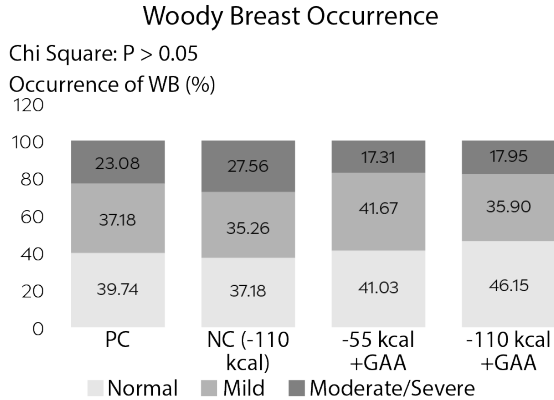


Figure 4. Percentage of breast filets by Woody breast category for dietary treatment groups. Maynard et al., 2023b, modified

Woody breast remains a challenge to profits from broiler meat production. Costs associated with Woody breast include added labor to identify and rework breast meat, down grading breast meat to lower profit brands, and lower value products, increased cook losses, and inconsistent results from mechanical slicing. The exact costs must be determined by each processor and depends on factors such as bird size and product lines produced. As processing weights increase, the severity of Woody breast tends to increase as well. Creamino® has a

track record of reducing the severity of Woody breast such that more full value breast filets can be produced without the need for slow growth or lower density diets which reduce yield. Creamino® consistently reduces FCR and spares expensive energy sources in broiler feed. Broilers of varying market weights have benefitted from Creamino® supplementation, but large bird producers may have the most to gain.

References are available on request.

Visit Alzchem at IPPE Expo 2024 at booth A551

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