

# Harnessing the power of Guanidinoacetic Acid in low energy diets

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Feed has always been the biggest production cost facing poultry farmers, and with the recent rise in global prices, combined with supply volatility, producers are now having to look even harder for ways to maintain their margins. As this situation is not likely to be resolved in the near future, the challenge facing nutritionists and poultry producers is how to maintain animal performance, meat quality and revenues, all while keeping feed costs down.

For decades, athletes have naturally enhanced their sporting performance through the consumption of creatine monohydrate, as it plays a vital role in cellular energy metabolism and essentially functions as a back up to the ATP system (Michiels et al., 2012). Taking a leaf out of their book and applying it to the poultry industry, may help cope with economic pressures better than previously thought.

## Guanidinoacetic acid

Guanidinoacetic acid (GAA), a metabolic precursor to creatine, is synthesized in the liver and kidneys mainly from glycine and arginine, however high-yielding farm animals do not have the capacity to meet their requirements through endogenous synthesis alone (Mousavi et al., 2013). Providing additional GAA as a dietary source of creatine supports the animal to reach its growth potential, as well as feeding directly into energy metabolism and sparing some of the arginine required for its endogenous synthesis, freeing this up to be used elsewhere.

The arginine-sparing effect of GAA has been increasingly utilised in commercial broiler diets in recent years due to its performance benefits over L-Arginine (Portocarero and Braun, 2021), however the energy-sparing benefits of the molecule are yet to be fully harnessed by the industry. Over the last decade, commercial trials have shown that GAA supplementation increases the energy efficiency of broilers when added to the feed. The results have shown that bird performance can be maintained even when the energy value of feed is reduced by up to 0.42MJ (100kcal)/kg below breeder recommendations when supplemented with 0.06 % GAA. This is equivalent to between 347 and 694 MJ ME/kg GAA.

## Energy sparing

A trial carried out at Harper Adams University which was recently published in *British Poultry Science*, showed that Ross 308 broilers from 1 to 42 days of age fed GAA-supplemented feed maintained weight gain (Figure 1), despite the energy content of the diet being reduced by 0.21MJ (50kcal) (Pirgozliev et al., 2022). Birds that were fed the lower energy diet without GAA supplementation (NC) had a significantly poorer weight gain compared to those that were given the same lower energy diet supplemented with GAA (NC+GAA) and those that were raised on a standard energy diet (PC). The NC+GAA group also had a European Poultry Efficiency Factor of 412, which was greater than the positive control and significantly higher compared to the NC group (Figure 2).

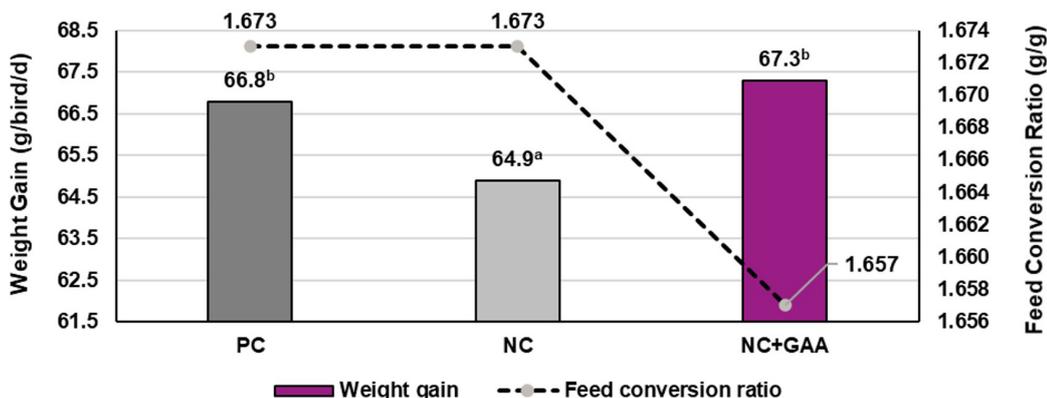
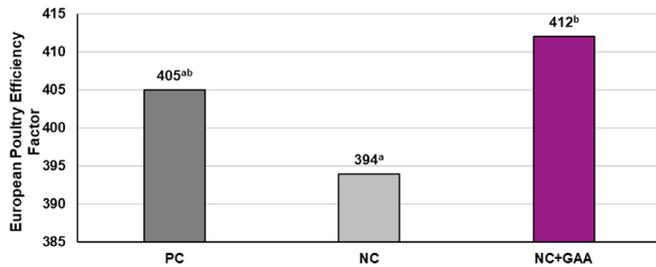


Figure 1: Effect of different energy levels and Guanidinoacetic acid (GAA) supplementation on growth performance of broiler chickens from 1 to 42 days of age (Pirgozliev et al., 2022)

Based on the results of the Pirgozliev study, applying the energy and arginine sparing effect of supplemental GAA would enable savings between £1.50 and £6 per tonne of feed. Whilst simply reducing the energy value of feed reduced the feed costs over and above the cost of adding the GAA supplement, when feed costs and animal performance were both included in the cost calculations, income over feed cost improved by £0.05 per bird in the NC+GAA group, compared to the PC group.



**Figure 2: Effect of different energy levels and Guanidinoacetic acid (GAA) supplementation on the European Poultry Efficiency Factor (EPEF) of broiler chickens from 1 to 42 days of age (Pirgozliev et al., 2022)**

### Where do we go from here?

With so many additives promising additional energy, nutritionists can be understandably sceptical of reducing dietary energy. Unlike many feed additives that are active in the gut and rely on a certain

feed composition to meet their potential (such as enzymes), GAA is active at a cellular level and, as a precursor of creatine, forms an essential part of energy metabolism in many biochemical reactions in many different tissues. Supplemental GAA has been proven to spare energy and arginine whilst maintaining or improving broiler performance, now it's up to you to see just how much money you can save.

### References

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