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## **Amino Acid Responses in Conventional and Slow Growing Broilers**

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### **Introduction**

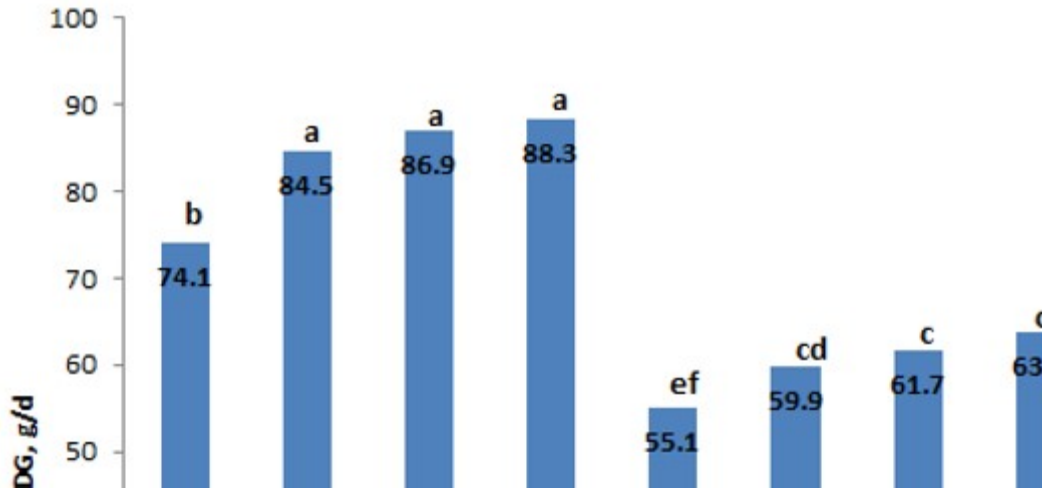
Conventional and slow-growing broilers are both quite responsive to dietary amino acids. However, when reducing dietary balanced protein (**BP**), the change in rate of gain on the slower-growing broilers results in a growth curve that is not as steep as it would be if using the current conventional broiler. Amino acid supply and balance, in combination with manipulation of dietary energy density, could enable customers to achieve the desired rate of gain when using slow-growing broilers, depending on the Global Animal Partnership or other certification level the integrator is aiming for.

### **Amino Acid needs**

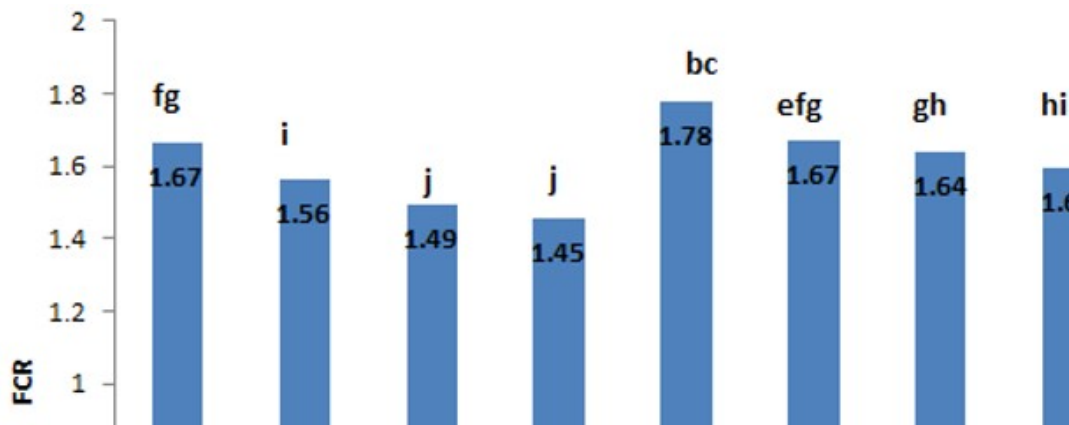
Most conventional broiler strains available in the market respond favorably to increased levels of BP (Corzo et al., 2010; Johnson et al., 2020; Kidd et al., 2005; Maynard et al., 2019). However, the degree of responsiveness to BP may vary in certain broiler strains (Corzo et al., 2004; Corzo et al., 2005), and other factors such as age or sex can also influence the outcome of certain production parameters (Corzo et al., 2005; Maynard et al., 2020). It then becomes necessary to create a feed program with specific BP levels that will be appropriate for factors such as genotype, sex, age or target weight being used, among others.

Internal research conducted at Aviagen (Study No. E1702) studied how BP can influence the response to BP by conventional and slow-growing broilers. Figure 1 shows the responsiveness of different genotypes to BP dietary supply. The Ross 308 broiler is a fast-

growing broiler, whereas the Ranger Classic, Ranger Gold and Rowan Ranger are genotypes with progressively reduced rate of body weight gain.



**Figure 1.** Average Daily Gain (ADG), expressed in grams/bird/day, of one conventional genotype (Ross 308) and three slow-growing genotypes (Ranger Classic, Ranger Gold, and Rowan Ranger) at 46 days of age when fed various BP levels: 80, 90, 100 or 110% of Aviagen recommendations (2019). Main effects of genotype and BP were significant ( $P<0.001$ ), and so was their interaction ( $P<0.001$ )



**Figure 2.** Feed conversion (FCR) adjusted for mortality, of one conventional genotype (Ross 308) and three slow-growing genotypes (Ranger Classic, Ranger Gold, and Rowan Ranger) at 46 days of age when fed various BP levels: 80, 90, 100 or 110% of Aviagen recommendations (2019). Main effects of genotype and BP were significant ( $P<0.001$ ), and so was their interaction ( $P<0.001$ )

Responses for FCR can be observed in Figure 2, and resemble those responses observed for ADG. In parallel with live performance variables, carcass traits expressed either as absolute or relative weights, responded similarly observing a noticeable improvement as BP progressively

increased from 80 to 110% of Aviagen amino acid recommendations (2019). Because of the lean content of breast muscle, an increase in dietary BP remained quite responsive in the slow-growing genotypes tested (data not shown).

As the modern broiler continues to evolve and make improvements through selection, it becomes necessary to reevaluate the amino acid needs of the bird, expressed both as a percentage of the feed as well as on a daily amino acid intake basis. As a primary breeder, we are constantly reassessing any changes needed to the nutritional recommendations of our products based on changes in growth curves and associated feed consumption patterns.

## Summary

The effects of BP on live performance and carcass traits for the modern commercial broiler have been well documented, but information on slow-growing crosses is limited. Recent internal research at Aviagen has shown that the modern broiler has become more sensitive to the energy density of feeds, and shown an ability to adjust feed intake by as much as 10% in response to the caloric load of feed. Slow-growing broiler responses to energy density of the feed are warranted as little information on this topic exists. However, slow-growing broilers have shown to be responsive to BP although in a slightly less manner than modern commercial broiler strain crosses. The BP used in a feed program must align with the key performance indicators of each integrator.

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