

Effect of feeding strategy on breeder and offspring performance

Broiler breeder hatching egg production and chicken quality play an important role in overall broiler meat production profitability. For that reason, studying the effects of different feeding strategies and feed additives on broiler breeder production and offspring performance is important for understanding how to improve performance and profitability.

by Ines Carvalhido,
Poultry Technical Lead and
Henk Enting, Senior Poultry
Technical Lead, Cargill.
www.cargill.com

As an example of feeding strategy work, we studied the effect of different crude protein (digestible amino acid level) to metabolisable energy ratios during the rearing period on body composition and subsequent breeder laying performance.

The crude protein to energy (CP:ME) ratios during the rearing period ranged from -2% up to +5% compared to breed-recommended levels.

Feed allowance was adjusted when needed in order to keep the body weights of the birds the same across treatments.

The CP:ME ratio had a clear effect on body composition; broiler breeders fed with higher levels of CP:ME during rearing linearly increased relative breast weight and reduced relative fat pad weights in week 22 as illustrated in Fig. 1.

Continuing the study

After the rearing period, all breeders received the same diet to study the effects of rearing feeds on laying and offspring performance. Feed intake was adjusted when needed, in order to keep body weights the same in all treatments.

It was observed that differences in body composition while controlling body weight impacted feed allowance to maintain performance, with a difference in daily feed allowance of 12g/day for the most extreme groups. The higher feed allowance was for the more-lean birds.

Fig. 2 provides the impact of rearing feeds on laying performance from 22 to 63 weeks of age. We observed that high crude protein diets during the rearing period had a negative effect on laying production.

Broiler breeders fed with -10% and -15% CP:ME diets during the rearing period had a higher laying production when compared

with +5% CP:ME and the control treatment.

Offspring performance followed a similar pattern as the effect of rearing diets on laying performance, with numerically the best performance for the intermediate CP:ME ratios that were tested in the trial, as can be observed in Fig. 3. CP:ME ratios not only impacted body condition, body weight, and breeder and offspring performance. We observed that other nutritional components such as vitamins, trace elements, and feed additives can play a role.

Feed additives

As an example of work done with feed additives, we studied the effect of natural antioxidants on chicken quality and broiler breeder performance. The initial approach was to replace vitamin E with natural antioxidants; however, we found there are additional benefits in breeders beyond the replacement of vitamin E.

The natural antioxidant product that was used in the trials, Proviox 50, was developed based on work in poultry and swine, including in ovo work for the selection of the most effective antioxidants. In the trials, half of the vitamin E level was replaced by the natural antioxidants at 40 or 80mg/kg

Continued on page 13

Fig. 1. Effect of different amino acid to energy ratios (CP:ME) during the rearing period compared to standard levels on relative breast meat and fat pad weights at 22 weeks of age; body weight was the same for all treatments. CP:ME ratios were 6.6, 5.8 and 5.30 per 1,000 kcal in the standard group for starter, grower and developer phases, respectively. Adapted from Soumei et al. (2018).

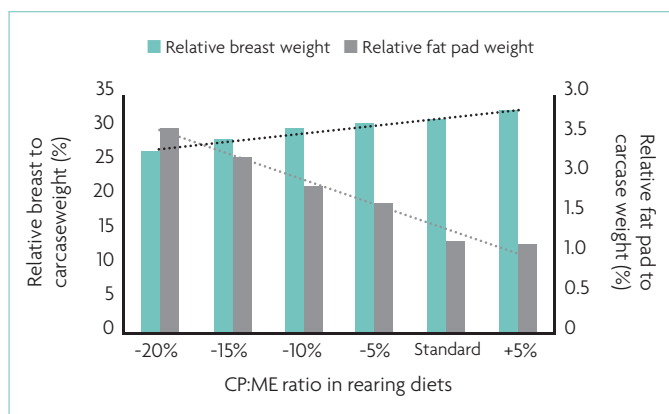
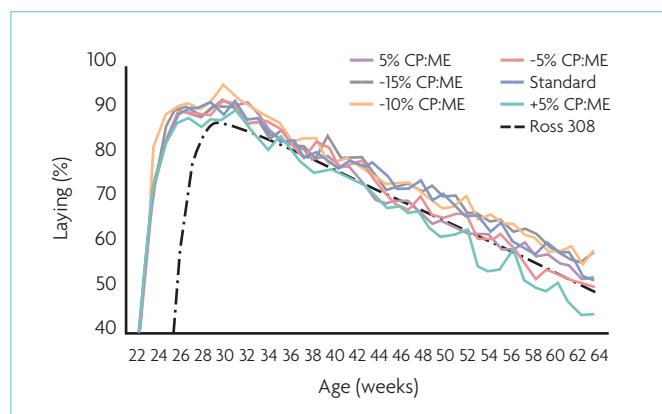


Fig. 2. Effect of different amino acid to energy ratios during the rearing period on feed allowance during the laying period. Body weight was 2,675g on average at 22 weeks of age and 3,937g at 64 weeks of age with no differences between treatments. Adapted from Soumei et al. (2018).



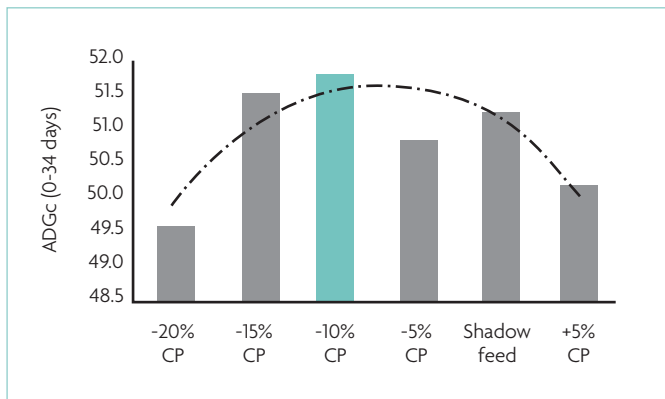


Fig. 3. The effect of CP:ME ratios during the rearing period on offspring performance (Average Daily Gain curve from day 0-34). Cargill Innovation Center Velddriel, 2016; 2017.

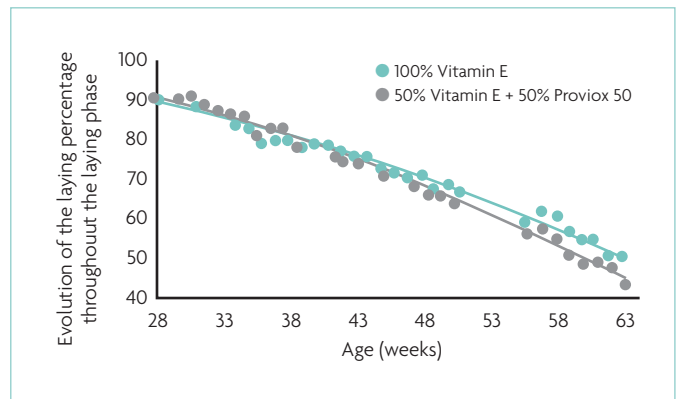


Fig. 4. The impact in laying production of five in-vivo trials replacing Vitamin E with natural antioxidant (Proviox 50) in broiler breeders from week 28 to week 63 of production. Cargill Innovation Center Velddriel, 2016; 2017.

Continued from page 11

vitamin E replacement. Trials demonstrated that natural antioxidants can support improved hatchability, especially under suboptimal conditions such as a change in temperature on the incubators. We also observed an improvement in eggshell quality, mainly after 38 weeks of age until the end of production. Not only were improved hatchability and eggshell observed, but also the impact on persistency.

In Fig. 4, the positive impact of natural antioxidants replacing half of the amount of

added vitamin E on laying persistency is shown. Besides the increase in the number of total hatched eggs, natural antioxidants also supported improved average daily gain of offspring generation by an average of 1g/day (average of seven trials).

Conclusion

Broiler breeder body development and composition during rearing can affect breeder and offspring performance;

additionally, body composition during rearing impacts the amount of feed that needs to be provided during the laying period to maintain body weight and performance.

Furthermore, feed additives like natural antioxidants can help to improve laying persistency, eggshell strength, and offspring performance.

Finally, it is important to balance feed composition and feed additives to maximise overall broiler meat production and performance. ■