

Broiler performance: the importance of the first seven days

For broilers grown to 42 days, the first seven days represents almost 17% of the total growing cycle – making it a crucial period to build the foundation for maximising their future physical performance.

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Having produced a healthy day-old chick, it is necessary to get them off to a good start by providing nutrients to maximise early physiological development and overall performance at 35-42 days.

The studies that emphasise the importance of these nutrients include:

- Vieira et al., 2012: "The early post-hatch period provides an opportunity for laying down the foundation that will control the overall capacity of body protein deposition throughout [the chick's] productive life."

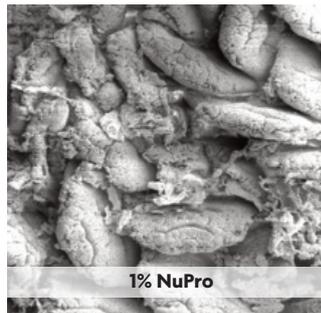
- Nitsan et al., 1991: "During this period, the gastrointestinal tract grows four times faster than the bodyweight of a broiler during the first two weeks of life."

- Noy and Skylan, 1997: "The maximum development of villi in the duodenum occurs at four days of age and the villi of jejunum and ileum at 10 days of age."

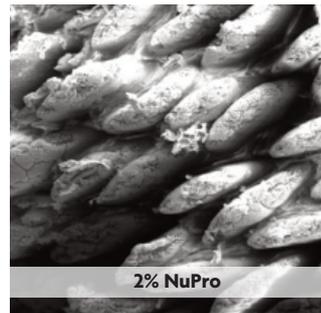
The first seven days provide an opportunity to maximise gut development, the most important factor for optimal broiler performance and liveability, since



Control



1% NuPro



2% NuPro

Fig. 3. Histology of intestinal villi of broilers fed yeast cell protein (NuPro) from 1-7 days (Zauk et al.).

the gut is critical for the immune function of broilers. It is, therefore, a matter of necessity to provide feed and water to the birds as soon as possible post-hatch.

Key management requirements

Good flock husbandry includes providing the appropriate brooding temperatures and at least the minimum ventilation requirements, as well as stocking density and accessibility to feed and water.

The goal during this period is to maximise feed and water intake, allowing for accelerated growth during the first week of the broiler's life. This will also bolster the development of not only the gut but the skeleton and cardiovascular system as well. This is the most feed-efficient period of the bird's life, with its bodyweight doubling in the first 72 hours.

To ensure feed intake and appropriate bodyweight gain, it is essential to monitor the following key performance indicators (KPI):

● KPI 1

Percentage of chicks with full crop after placement:

- 2 hours: target 75%.
- 12 hours: target >85%.
- 24 hours: target >98%.

If these targets are not achieved, then the key management requirements should be reviewed to take corrective action. One of the most common problems during this period is that the brooding temperature is not adjusted soon after placement. When overheated, the chicks may end up drinking instead of eating. Checking crop fill allows early corrective action to be taken, if necessary.

● KPI 2

Check chick bodyweight 72 hours after placement – it should be double what the chick weighed at one day old.

● KPI 3

Check chick bodyweight at seven days after placement – it should be 4.5 times what the chick weighed at one day old.

Maximising gut and other physiological development in the first seven days is crucial to ensuring performance at harvest. As shown in Fig. 1, every 1g gain above 160g at seven days is worth 6g of average daily gains (ADG) at 37 days.

Only a healthy gut can digest and absorb the maximum amount of nutrients and get the most out of the diet, resulting in a dramatically improved feed conversion ratio (FCR) – such as seven-day bodyweight increases from 160g to 180g (see Fig. 2).

Measuring seven-day bodyweight gives an indication of whether or not the brooding management has been successful.

The data consistently shows that a seven-day bodyweight that has

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Fig. 1. Every 1g gain above 160g at seven days is worth 6g average daily gain (ADG) at 37 days (Cobb Vantress).

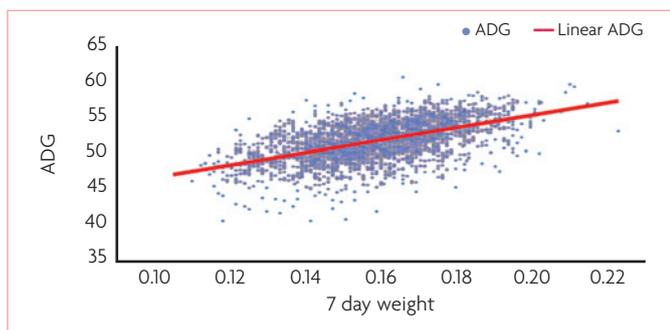
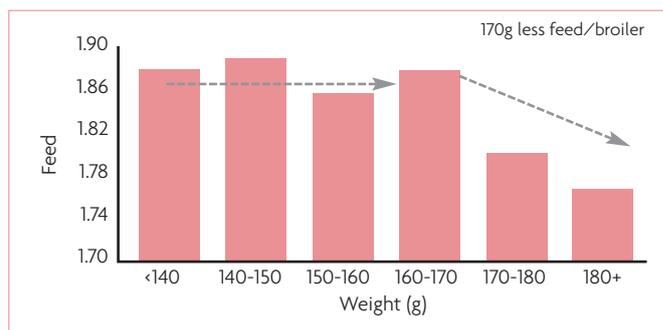


Fig. 2. Improved feed conversion ratio (FCR) when seven-day bodyweight increases from 160g to 180g (Cobb Vantress).



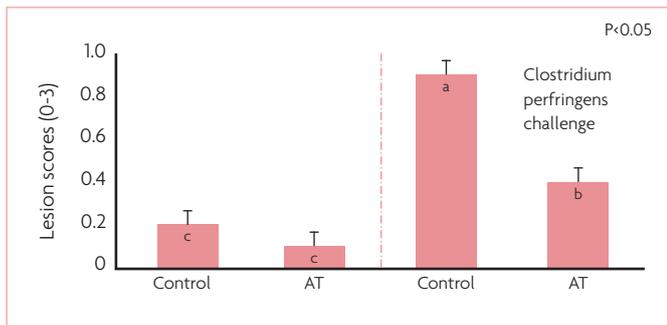


Fig. 4. Necrotic enteritis evaluation at 21 days (Hofacre et al).

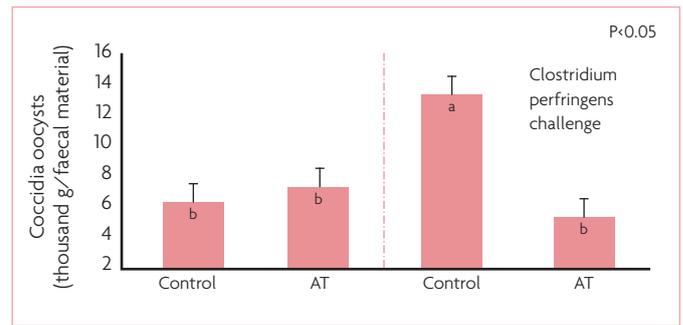


Fig. 5. Coccidia shedding at 21 days (Hofacre et al).

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increased 4.5 times over the day-one weight correlates to better overall broiler performance.

Nutritional intervention

Many nutritional interventions – such as enzymes and probiotics – have been used in the industry with varying success; however, for the immature, first-week gut it is important to compose the feed based on the breeder's specifications for a pre-starter, which requires high quality, highly digestible raw materials that deliver available nutrients. The prestarter must be an excellent crumb or micro-pellet with less than 10% fines.

Raw materials are more important than nutrient levels. For instance, isolated soya or yeast cell protein can also be included in the pre-starter, as these are highly digestible protein sources. Yeast cell protein (NuPro, Alltech Inc), in particular, has been shown to aid gut development, as reported by Zauk et al. (Fig. 3). It is important to note that, when developing the gut in the first seven days, it is essential to maintain gut

health by protecting against various challenges, such as coccidiosis, necrotic enteritis or dysbacteriosis, through good husbandry and management practices, as well as by providing specific feed additives.

Alltech has recently developed a customised solution that specifically works to support gut development and maintain gut health.

Viligen prepares the immature gut for efficient nutrient absorption and rapid growth and encourages feed intake by providing a combination of fatty acids, prebiotic components and readily available trace mineral

forms. Studies indicate that this technology creates an unfavourable environment for pathogens in the gut, while simultaneously promoting microflora, leading to the improved absorptive capacity of the gut.

In a recent study investigating necrotic enteritis caused by *Clostridium perfringens* in broiler chickens, Hofacre et al. reported that:

- The birds fed diets supplemented with this Alltech technology (AT) had lower lesion scores compared to the control when challenged with *Clostridium perfringens* (Fig. 4).

- Also, dietary inclusion of AT during a *Clostridium perfringens* challenge successfully reduced the concentration of coccidia oocysts in faecal material (Fig. 5).

- Weight gain was similar in the birds fed diets supplemented with AT (challenged with *Clostridium perfringens*) compared to the non-challenged groups (Fig. 6).

Conclusion

The importance of the first seven days in the life of the broiler chick cannot be over-emphasised, as this week sets the foundation for the lifetime performance of the broiler.

It is imperative that chicks eat and drink as soon as they are placed; flocks that fail to make a quick transition to feed and water may suffer from higher early mortality rates and may not be able to catch up. Stimulating feed and water consumption during their first several days will maximise gut development and give chicks the best start. Furthermore, it is just as important to maintain a healthy gut through good diet and appropriate nutritional intervention. ■

Fig. 6. Performance at 42 days – weight gain (Hofacre et al).

