

Feeding a broiler super prestarter boosts performance

Efficiency is the key to success in broiler production and the importance of a good start in life is discussed for all species. In the case of broilers, the first four days of a broiler's life represents around 10% of their whole life. What a chick eats during this time can directly impact its future performance.

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Availability of the right nutrients immediately post-hatch is critical for growth and development of the internal organs. A rule of thumb says that every 10g more body weight at day seven results in 1.4% higher ADG and 1% lower FCR until final live weight (Fig. 1). To ensure good broiler chicken profitability, a perfect start is very important.

Early chick nutrition

Optimal development of the gastrointestinal tract (GIT) is essential in young birds for future growth and is related to immune function. The yolk, containing antibodies and good fatty acids, is the colostrum for the chick. In newly hatched chicks, the yolk

accounts for 16% of the body weight, which is absorbed during the first 2-3 days.

In commercial broiler operations it is not uncommon for newborn chicks to experience a delayed access to feed. With feed absence, the chick goes into survival mode and burns not only protein and fatty acids in the yolk, but also its own fat and muscle reserves from the organs, such as the liver and the heart.

The digestive system of the bird at hatch has limited ability to digest and absorb nutrients. It is therefore vital to provide a diet that contains highly digestible and available nutrients. The metabolisable energy and amino acid digestibility of grains are lower in young birds and indigestible nutrients can serve as substrate for undesirable gut micro-organisms.

The aim should be to kick start the digestive system of the young chick as soon as possible. Feed particle size and feed presentation will play a significant role in this.

Definition of a super prestarter

A special diet fed to broiler chicks for the first 3-5 days post-hatch is often referred to as a super prestarter (SPS). The primary aim of a SPS is to fulfill the specific nutritional needs of the young chick, supporting its transition from

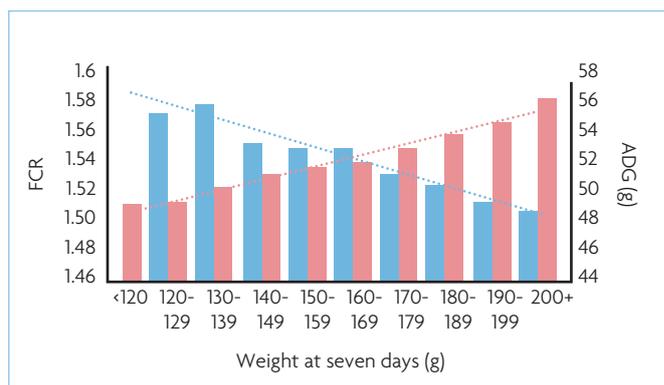


Fig. 1. Higher broiler weights at day seven results in better growth performance based on data of 102.3 million broilers.

eating the yolk sac to the first diet consumed. In a SPS, different high quality sources of protein, fats and carbohydrates are used and it has specific vitamin, mineral and amino acid specifications. It is important to provide the newborn chick with optimal nutrients in the right ratio and the right feed form. The ingredients should be highly palatable as well as easily digestible. SPS diets are often in the form of 2.0mm micro pellets or crumbs and should be highly palatable and dust free.

In order to achieve the best results, it is important to stimulate the chick's metabolism from the beginning and, as well as gut health, it is essential to focus on skeletal development.

Early feeding ingredients

Specialty ingredients often used in SPS formulas include animal plasma, wheat gluten, fish meal and highly digestible protein concentrates, all of which are highly digestible yet more expensive than conventional proteins.

Some of these ingredients provide significant side-effects beyond high digestibility. Such is the case for animal plasma that has an exceptionally high concentration of immunoglobulins and other bio-factors that enhance gut development.

Such specialty dual-action

ingredients should be evaluated based on their total contributions.

Based on this knowledge, Joosten – young animal nutrition provides two products specially designed for young animal (early) feeding, to boost gut health and performance: FMR Ω 3 and JPC 56.

Both products are ingredients of choice which perfectly match within the specific SPS diet and have an excellent protein digestibility of over 95%, a result based on the selection of ingredients and unique in-house processing technology.

The special products contain balanced levels of amino acids, including high levels of glutamine to support gut health development. With FMR Ω 3 the supply of essential omega 3 fatty acids (EPA/DHA) contributes to an increased anti-inflammatory capacity.

These premium products result in an improved gut integrity, a more efficient nutrient use and significant increased growth performance. Better performance and better gut health in the early feeding phase strongly contribute to a better profit for a lifetime.

Aims of a super prestarter

● **Boosting gut development**
During the first two weeks of life, the GIT grows four times faster than

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Table 1. Trial results from feeding a super prestarter formula versus a conventional one for the first seven days post-hatch in a European commercial broiler integration.

	Batch 1		Batch 2	
	Conventional	Super	Conventional	Super
Final weight day 35 (g)	2,168	2,243	2,243	2,289
FCR	1.65	1.59	1.60	1.51
Cost (€)/kg weight	0.54	0.52	0.52	0.50
Mortality (%)	4.24	2.94	4.11	3.39
Kg per m ²	43.03	44.88	46.01	45.87
Profit per chick placed (€)	0.01	0.09	0.12	0.18

	Control (155g)	Super (155g)	Brooding supplement (5g) + Super (150g)	SEM
Weight day 0 (g)	48.7	48.7	50.2 ^s	0.30
Weight day 7 (g)	180.8 ^a	195.7 ^b	191.5 ^b	2.11
Daily gain (g)	18.9	21.0	20.2	0.28
Daily feed intake (g)	38.1	39.5	38.4	0.33
FCR	1.32	1.17 ^s	1.23	0.018
Mortality (%)	13.2 ^s	3.5	3.5	1.51
Yolk weight day 4 (g)	0.67	1.09	0.81	0.12

Table 2. Trial results day 0-7. ^{ab}significant differences (P<0.05); ^s trend relative to control (P<0.10). In the first week the broilers became sick due to an E. coli infection; they were treated with antibiotics for three days.

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the rest of the body. This growth is correlated with the feed intake. In avian species the formation of muscle fibre is completed at hatch and the skeletal muscle growth starts rapidly after hatch. Because of this high muscle growth, the demand for amino acids is high.

The highest priority in the first week is the development of the intestinal tract, because it is this package of organs that is driving body weight gain and, as such, requires up to 40% of the energy and protein that a young broiler consumes. High protein content is necessary in diets for young chicks for growth and also to help maintain body temperature.

Probiotics may be added to SPS diets in order to feed the gut with beneficial bacteria or protect it from pathogens.

● Supporting immunity

Mortality in broilers mainly occurs in the first week of life. At birth, chicks have no active immune system and after a couple of days the broiler runs out of maternal immunity and the development of their own immune system takes 7-10 days. This makes the broiler more sensitive to infections.

Development of the immune system starts in the embryo and

continues post-hatch. The bacterial flora strongly contributes to the modulation of the gut immune system.

In the first week of life, there is a rapid increase in the number of leucocytes, due to the growth of the lymphoid organs. These increases are important for acquired immunity development. The yolk sac is important because it transfers passive immunity in the form of immunoglobulins from the yolk and albumen to the newborn chick.

The synthesis of immune cells is a metabolically expensive process and is highly dependent on the presence of nucleotides. These protein building blocks can be found in certain concentrated protein products which should be used in SPS formulas.

Table 3. Trial results day 1-35. ^{ab}significant differences (P<0.05); ^s trend relative to control (P<0.10).

	Control	Super	Brooding supplement + Super	SEM
Weight day 35 (g)	2,338	2,385 ^s	2,355	13.8
Daily gain (g)	64.4	65.9 ^s	65.4	0.44
Daily feed intake (g)	95.2	96.6	96.3	0.56
FCR	1.48	1.47	1.47	0.006
Mortality (%)	16.0 ^a	7.6 ^b	4.9 ^b	1.86

● Improving uniformity

Uniformity is an important goal for commercial broiler producers. To achieve this, feed intake should be maximised at critical stages to support gastrointestinal development. Closing the growth gap will be most cost effective when the birds are still young chicks.

The development of the GIT and immune system is important in modern broiler production to support growth and performance.

Feeding a SPS diet that specifically meets the requirements of a chick in the first few days of life is the best way to ensure a good start. It is a significant investment with the aim of promoting efficiency throughout the broiler's life cycle.

Field trial results

Table 1 shows the results of feeding a SPS diet versus a conventional one for the first seven days post-hatch in a European commercial broiler integration. In this trial, a conventional and SPS diet were followed with typical starter and grower diets until slaughter. As can be seen, after two batches of broilers were tested, the conventional diet did a good job.

As expected, the SPS gave chicks an early advantage that lasted until market age (35 days). Broilers fed the SPS for the first seven days post-hatch were, on average, 60g heavier at market age, more

efficient in converting feed to meat by eight points, less costly to feed despite the extra cost of the SPS and more profitable by 7 euro cents per bird.

Another trial in broilers (Table 2), carried out in the Poultry Research Centre in Vliert, The Netherlands, shows the results of feeding a typical starter diet (control) versus a SPS diet and a diet consisting of a brooding supplement in combination with a SPS, for the first seven days post-hatch followed by a normal feeding programme including haemoglobin powder. On day 35 the chicks that received the SPS diet were around 50g heavier compared to the control group (Table 3). This trial confirms again the advantages of feeding a SPS.

After establishing the need for a SPS, it is important to decide on the maximal length of its use to control the costs. In most cases, feeding a SPS is rarely practiced beyond the first week post-hatch. The higher the quality of the SPS, the shorter the duration of the feeding period required. In one controlled study, a SPS diet containing 2.5% animal plasma was offered for the first five days post-hatch.

The chick growth was enhanced by almost 35%. Broilers fed the SPS diet during the first five days were at market age (42 days) about 10% heavier than the ones that had been on a conventional starter diet.

These results show that the use of high-quality protein sources in SPS diets is a worthwhile investment. There is more on-going research trying to quantify the effects of SPS formulas, but it is worth the expense.

It looks surprising that such small changes in feed formulation for just a small period of time have a big impact throughout the commercial life of a broiler. An investment in early nutrition pays good dividends at the end. ■

References are available from the author on request