

Balancing the diet to provide the best feed for performance

Due to the increased pressure on animal performance, nutritional expertise is needed in all phases of the animal's life. Feeding makes up the major cost of production and good nutrition is directly reflected in the bird's performance.

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The most recommended way of feeding chickens is with a balanced ration, whether the birds are indoor housed or outdoor housed. All diets contain corn, wheat and fat/oil for energy, soybean meal for protein, and vitamin and mineral supplements. Commercial rations often contain coccidiostats for combatting coccidiosis.

In many parts of the world, antibiotic growth promoters (AGP) are also added to the feed, to promote health and improve growth. However, in recent years a decrease in the use of these antibiotic growth promoters has been seen and big changes are also expected in the future..

Indispensable feed additives

A diet should be well balanced. It is very important to achieve a good equilibrium between energy and protein in the diet. Without proteins, there is a lack of building blocks and the chicken is not able to build muscles, but without energy, these building blocks can not be constructed into broiler meat. So it is important to give enough proteins, as well as energy.

The use of by-products in poultry feed has the potential to greatly reduce broiler and layer feeding costs. Producers have been using by-products for many years, because it is a relatively cheap source of protein and energy.

As such, it helps to reduce the cost of soy and maize based feeds. The risk of using these products is almost non-existent since the material is often treated through different processes, such as hydrolysis. Yet



it is good to upgrade these by-products by using the right additives.

During the last few decades, additives have been indispensable in the feed. The common additives are phytases, NSP enzymes, emulsifiers, AGP replacers (for example medium chain fatty acids), natural antioxidants and mycotoxin binders.

All of these additives have a scientific proven effect on chicken performance and can no longer be missed out of broiler feed. Most of the additives can be added in the feed through an optimised premix.

Feed processing

In the past, most diets were offered in a mash form. Mash quality is assessed by the size and uniformity of its particles. In the past, a positive correlation between the increase in feed particle size and broiler growth has been shown.

Good uniformity of particle size is essential because birds prefer bigger particles.

The dominant birds will quickly eat the bigger cereal particles, while the rest of the birds will eat the finer particles. In this way, the big birds eat the energy while the small birds eat the protein, the vitamins and the minerals.

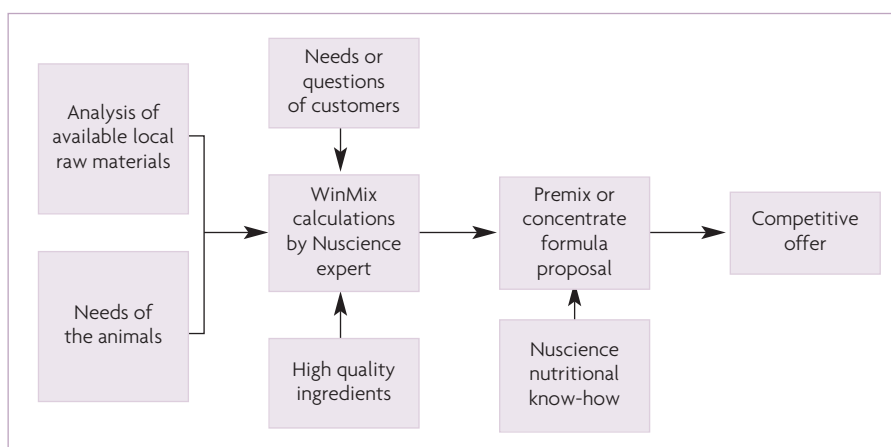
This is not the best strategy to achieve uniformity of the flock at the end of the growing period. Nevertheless, with a good structure, it was always possible to obtain good performance results with mash diets.

Recently, genetic companies have been selecting for a higher and faster feed intake. In this way, a reduction in FCR can be achieved, since there is less maintenance cost for the bird.

Nowadays, most of the feed is pelleted enabling the bird to eat more at once. Pelletting is the most prevalent heat

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Fig. 1. The Nuscience approach for the best feed formulation.



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treatment in the production of poultry feed. The objective of pelleting is to agglomerate smaller feed particles into larger particles. In this way, pellets will enhance the economics of production by increasing the feed intake, and thus growth performance and feed efficiency.

However, due to the heat, moisture and mechanical pressure applied during conditioning and pelleting, some chemical and physical alterations occur that may have beneficial or detrimental effects on feed components, gastrointestinal development and bird performance.

● The pelleting process may also result in partial denaturation of proteins: a process

which can potentially improve protein digestibility and to some extent starch digestibility due to inactivation of enzyme inhibitors (the so-called trypsin inhibitors).

● The pelleting process has been shown to gelatinise starch, but only to a small extent, and thus may be of modest relevance in starch digestion.

● Cell wall breakage, as a result of the physical stress of pelleting, may also provide greater accessibility of nutrient contents.

● The pelleting process also remains a potentially aggressive process on the stability of exogenous feed enzymes and vitamins, which is a major concern of feed manufacturers.

● The pelleting process will improve feed hygiene.

It is clear that research is required to identify and evaluate possible strategies to manufacture the best digestible high quality pellets.

Such strategies will require novel approaches to improving feed hygiene that are not detrimental to feed nutrients.

Premixes and concentrates

Poultry feed ingredients include energy raw materials such as wheat, corn, barley, millet, sorghum and by-products. For protein content, nutritionists include soybean meal, full fat soybeans, rapeseed meal, sunflower seed meal, cottonseed meal, coconut meal and other oilseed meals (peanut, sesame, safflower, etc). Animal protein sources (meat and bone meal, fish meal, etc) are also sometimes added to the feed. Grains are usually ground to improve digestibility. Soybeans need to be heated – usually by extruding or roasting – before adding to the diet.

Since there is a big variety of raw materials in different parts of the world, the feed composition will never be the same. For this reason the nutritional department of Nuscience always formulates a personalised feed for optimum performance. The composition is determined by the raw materials available in the market and the needs of the animals (Fig. 1).

Often raw materials are analysed in the Nuscience laboratories first to make it possible for the nutritionists to formulate with the exact nutritional values.

This feed formula is optimised in the WinMix formulation program, a co-development of Nuscience and WinMixSoft. For a premix, the inclusion ranges from 0.5-2.5% in total feed.

Often, in order to have a well-balanced feed for optimal performing animals, it is necessary to add protein sources and thus to make a concentrate. Nuscience is producing concentrates with inclusion rates from 5-30%, according to client needs.

Summary

Since broilers only have six weeks to grow, feed formulation can not afford any mistakes. A mistake will be noticed right away and there is no time to catch up. As a consequence, an economical punishment follows immediately after the growing cycle. That is why perfection is needed in nutrition.

Nuscience can offer this perfection with its many years of experience and extensive research and development into the highest quality premixes, concentrates and additives. The highlight is the construction of their state-of-the-art factory in Drongen, Belgium in 2015. Currently, this factory is considered the most modern premix plant in the world. ■