Effective feed utilisation

17

by Otavio Antonio Rech, South America Sales & Technical Representative, Hendrix Genetics (otavio.rech@hendrix-genetics.com)

There are many situations where a good dietary formula is not sufficient to ensure effective production. Whoever designs diets should take into account that there are a number of factors that may prevent the bird from effectively utilising the nutrients provided. We could classify these factors as endogenous and exogenous.

Endogenous factors are characteristics such as food preferences (grain size), the state of the digestive tract, preferred time of consumption, calcium metabolism, selectivity or the presence of internal parasites.

Exogenous characteristics are the presence of mycotoxins in the feed, ambience interference (temperature/ventilation/humidity), stocking density, water and food availability and the presence of anti-nutritional factors in the food (phytate, non-starch polysaccharides). We must be aware that when we formulate diets, these considerations and a physiological understanding will make all the difference if we are looking to achieve best performance.

Having this in mind, we can say that by practicing the technique of emptying the feeders in the middle of the day for up to four hours, the use of coarse particles (75% between 0.5 and 3.4mm), midnight feed intake, and fresh water are important tools during periods of heat stress. Several experiments support this understanding that we must consider bird feeding behaviour.

Emptying the feeder once daily appears to reduce the selectivity and improve the consumption of poultry. Feeding 'ad libitum' seems to produce a certain 'indifferent behaviour' about feed consumption. Use of the technique also promotes the development of the crop, because birds have greater avidity when they find the feeders full after induced fasting and of course expand the crop more using it for its main function: food storage.

Presentation of the food in coarse particles agrees with the preference of the birds to consume grains. Birds have only 12 taste buds (Hill, 1971), however the lack of taste is compensated by mechanoreceptors in the beak (Gottschaldt and Lausmann, 1974) and particle size can cause alteration in the behaviour of consumption (Savory, 1979).

The midnight feeding intake is a flash light of 1.5-2.0 hours that is provided after 3.0 hours with the lights off. This technique encourages and stimulates feed consumption. When birds are stressed in hot temperatures, providing food in the cooler periods of the day will contribute to improvement of eggshell quality as well as providing a source of calcium at a time of increasing demand. This will reduce bird dependence on medullary reserves. Also, considering the consumption behaviour of birds, it is recommended that the daily amount of food is provided in greater proportion in the afternoon (65% of the total amount). This feeding behaviour in birds is ancestral, as in other animals they feed in greater proportion in the afternoon to support the long period of fasting imposed by night

It is also known that birds do not consume feed when their water is restricted. This is not always due to lack of water but often the wrong position of the drinkers or their inadequate temperature. A good diet is worth nothing if the primary problem on the farm is water temperature.

Considering the ingredients that are chemically formulated in the food, they also have components that the birds cannot digest. This is because they do not have the appropriate enzymes. In this area, the evolution and development of a range of enzymes adapted to bird diets shows a promising scenario in addressing this nutritional bias as shown in the table below (adapted from Thorpe and Beal, 2001).

Enzyme	Action	Ingredient that acts	Expected benefits
B-glucanase	B-glucan degradation and oligosaccharides	Diets based on oats, barley and rice	Reduced viscosity and improved use of nutrients
Amylase	Degrades starch to dextrins and sugars	Diets rich in starch containing corn and other	Increased availability of glucose
Cellulases	Degrades cellulose products of lower molecular weight sugars	Diets rich in fibre (bran, barley and others)	Increased energy availability by allowing the use of cell contents
Xylanases	Degrades arabinoxylans and ` products of lower molecular weight and sugars	Diets based on oats, wheat, corn, barley and rice	Improves utilisation of nutrients and reduces the excretion of water
Galactosidases	Degrades oligosaccharides and antinutritional factors	Soybeans and other legumes and oleginosas	Improves the availability of energy and reduces the viscosity
Phytase	Degrades links phytate with divalent ions (Fóstoro and inositol molecule)	All types of cereals and oilseeds (rice bran, corn soy and others)	Reduces needs of inorganic phosphorus and phosphorus excretion
Proteases	Protein and peptides and degrade amino acids	Diets with legumes	Increases the digestibility of amino acids and reduces the nitrogen excretion
Lipases	Degrades lipids to fatty acids and monoacylglycerol	Diets rich in vegetable oils or animal origins	Improves fat digestibility

We should undoubtedly look to design a dynamic diet that will address all the issues presented above. Thus the diet will be closer to the actual needs of the flocks and no doubt be able to extract all of the genetic potential developed over 60 years. ■

ISA
A Hendrix Genetics Company

Countering disease threats

18

by Bart Stokvis, poultry veterinarian, Hendrix Genetics (bart.stokvis@hendrix-genetics.com)

Countering disease threats is a very nice subject to address as a poultry veterinarian. Preventing disease is much more satisfactory then curing disease.

Farmers are countering disease threats because they do not like to collect dead birds. Farmers also know very well that diseases are costly. Healthy birds are efficient producers. Diseases cost energy which equals money. Besides, a dead layer cannot produce its 500 eggs.

Maybe even more importantly, we poultry people are producing food. Food must be 100% safe for the consumer; free from pathogens and contaminants.

We must not forget that avian influenza is a zoonosis and governments can implement special programs for certain diseases. One way to solve a disease problem is 'kill and remove'. Eradication programs can kill a lot of birds and trading restrictions can disturb the market; both of which have a large impact on the profitability of our business.

You can counter disease threats from different perspectives.

● **Big picture, compartment, region, country, continent.**

In the big picture, governments are involved. Diseases are named notifiable and an obligatory monitoring program is put in place. A combination with an obligatory vaccination program is possible and countries can close the import from countries which can not comply with their veterinary requirements.

A compartment is a private initiative within the big picture. It is a group of farms with a strict biosecurity and monitoring program which gives them a special health status. A compartment must be approved by the official authorities.

● **Own property, own responsibility!**

What can you do to protect your own birds? Apply a vaccination program, specifically designed for your farm and be very strict on biosecurity.

Make sure nothing is brought on to your premises by visitors or via materials. Keep out rodents and wild birds.

● **Own responsibility?**

What happens when a farm becomes infected with a notifiable disease? First of all, it is a personal, emotional and financial disaster for the farmer. But not only the infected farm suffers. Trading restrictions disturb the market! Highly pathogenic avian influenza H5N8 was isolated from wild ducks, in Germany from a Common Teal and in The Netherlands from an Eurasian Wigeon. The infected farms all kept their birds indoors, so how did the virus come in?

Eurasian Wigeon.

Common Teal.

In Germany, The Netherlands and England, the farmers, their veterinarians and the authorities reacted very fast to the first clinical signs of disease. Thanks to that, the spread of highly pathogenic avian influenza from farm to farm was prevented.

Nevertheless, the economic damage for the poultry sector was huge.

To conclude, contact infections, like avian influenza, are brought in. The main risk factors are people, poultry related materials and vermin like rodents and wild birds (and farm pets?).

Please have a close look at the biosecurity measures on your farm. Are they sufficient?

Keeping our countries free from avian influenza is a joint responsibility! ■

Management of chicks during the first week

by Pavel Kolnik, Hendrix Genetics (pavel.kolnik@hendrix-genetics.com)

Environment

It is known that the newly hatched chick compared to many other avian species and mammals is much less dependent on special assistance from its parents while looking for water and feed.

This might have been one of the phenomena that allowed poultry production to become an industry very fast. In spite of its industrial character with automation or even robotisation of many processes, this type of production still requires a skilled stockperson to check that everything is managed correctly (for example the presence and run of automatic drinkers and feeders does not necessarily mean that all the birds of the flock eat and drink sufficiently).

Early nutrition

The management of the flock during the first hours and days after hatch takes into account the conditions and techniques that enable the chicks to utilise the yolk sac and to start to drink and eat as soon as possible so that their fast growth and development is assured.

The yolk sac contains the important nutrients – proteins, energy, minerals and biologically active substances like immunoglobulins and vitamins. It allows the relative independence of the chick on water and feed for more than 48 hours.

On the other hand, the presence of the feed in the digestive tract of chicks not only starts up the process of digestion, with production of all the digestive juices and peristaltic movements of the intestine, but also enhances the absorption of the yolk sac content. It is good to provide the chicks with water and feed very soon after hatch. In the case of long delivery times a broken maize or special products can be put into the boxes to support the chicks during transport.

Temperature

The small chick is poikilothermic until 5-6 days of age as it is not able to regulate its body temperature and keeps that of the environment.

Therefore we have to maintain the house ambient temperature relatively high, between 33-32°C during the first week. The ideal body temperature of the chick is around 40°C and the chick achieves the ideal metabolism at this temperature.

The floor temperature and also that of the litter material should be high enough (30°C) to avoid the chilling effect to the chicks that come into a close and lasting contact with it.

From around five days of age the chick is able to maintain an ideal body temperature if kept in a certain ambient temperature range. The set points of the house temperature might be decreased to around 32-31°C for the rest of the first week. The best indicator of the comfort of the chicks is their behaviour.

Air quality

Humidity is also one of the important parameters of control in the environment of the chicken house. It should be kept in the range between 55-60%.

Too low humidity dries out the mucous membrane of the respiratory tract and prevents its correct function. Too high humidity may enhance the bacteria and fungi growth in the chicken house; if combined with higher temperatures, the regulation of the body temperature for the chicks is more difficult.

Farmers sometimes tend to not ventilate the house during the first week of rearing to save energy.

However, a steady ventilation rate in the house helps to keep good humidity and temperature as well as enough oxygen and lower rates of noxious gases and dust in the house.

Light

The daylength of 22-23 hours with enough light intensity (30-40 lux) during the first week encourages the water and feed intake as they both support the activity and exploring behaviour of the chicks.

The even distribution of the light throughout the house is as important as its intensity. Avoid dark spots in the house; these are probably even more dangerous in the cage rearing of chicks.

Feed quality

Only a good quality feed produced from raw materials of a premium quality should be used for the chicks during the first week of age.

The easily digestible feed with enough high concentration of energy and amino acids will enable the chicks the fast start of growth and a 'smarter' utilisation of the functional proteins and fats of the yolk sac. Keep more frequent feed distribution of smaller amounts of feed during this time.

The physical structure of the feed is almost as important as its chemical composition.

The chicks do not like to eat flour (very fine mash) and cannot eat too big particles (bigger pellets), therefore try to avoid both extremes.

Equipment and space

One of the parameters that are probably most omitted is the total feeder and drinker space to be assured per chick.

Overcrowded flocks with not enough living, drinking and feeding space tend to develop a lower average body weight with low uniformity.

The chicks have to have a chance to find the feed and water and be able to get to both of them easily even during the first week of life. A good practice during this period is to offer the chicks the feed on trays or paper spread on the litter/cage floor and to use the additional drinkers during this time.

A uniform flock with a standard

Infectious coryza (haemophilosis) 20

by Bart Stokvis, poultry veterinarian, Hendrix Genetics (bart.stokvis@hendrix-genetics.com)

The list of pathogens causing respiratory disease in layers is long and includes viruses, bacteria and mycoplasmas. Whether they cause disease and the severity of the symptoms varies depending on the level of protection, environmental circumstances and secondary disease threats.

Due to concern about the re-occurrence of infectious coryza, this column focuses on this old disease. Coryza means 'a cold', a running nose and the name describes the most obvious clinical sign of the disease.

Clinical and pathological signs vary from mild to severe. Disease symptoms can be mild in flocks kept under good conditions, but when the microclimate situation is poor and when secondary pathogens are involved, mortality can be very high, up to 60-70%.

Almost always, the infraorbital sinuses are inflamed and full of exudate, from semi-fluid to solid.

Egg production can be very much reduced, because the birds are really sick. When they do not eat, they cannot produce eggs. Coryza itself is not targeting the reproduction tract.

Infected birds can recover but will be lifelong carriers of the pathogen. Once you have it, it is very difficult to control or eradicate the pathogen, especially on multi age farms. It is sometimes difficult to diagnose coryza as it can easily be confused with pasteurellosis, mycoplasmosis, ornithobacteriosis, Newcastle disease or infectious bronchitis, infectious laryngotracheitis or even avian influenza.

The official name of the bacteria has been changed from haemophilus to avibacterium. The full name is Avibacterium paragallinarum. It is a Gram negative, microaerophilic rod. It is, almost always, catalase negative and it shows 'satellite growth' on a sheep blood agar plate. The reason for this satellite growth is that it needs nicotinamide adenine dinucleotide (V-factor) for in vitro growth. A staphylococcal colony can be used as a source for this V-factor. The blood agar plate is inoculated with a staphylococcal colony and with the sample from animal organs, suspected for coryza. If coryza is present, you will see very fine growth around the staphylococcal colonies. In vitro growth of avibacterium should be done under microaerophilic conditions.

PCR can also be used to diagnose coryza. Serology is not useful. Coryza is very contagious. Biosecurity is an important preventive measurement.

Do not introduce avibacterium infected birds! Be critical on people and equipment. They can both bring the disease onto your farm. The source of infection can be backyard poultry housed close to commercial farms or owned and taken care of by employees of commercial farms.

The use of surface water is obsolete. Be aware of the role of vermin in the spread of this pathogen. Bacterial vaccines are available and can help to reduce the clinical signs and to reduce the spread of the pathogen.

The avibacterium is susceptible to all kinds of antibiotics, like oxytetracycline, macrolides, trimethoprim-sulfa combinations or fluoroquinolones. Antibiotic treatment can help reduce clinical signs in diseased flocks but cannot eradicate the pathogen. Coryza returns as soon as you stop the bacterial treatment.

Antibiotics can be used strategically, as an emergency measure, around the age of the birds on which clinical signs normally start, or at moments of stress, like transfer from rearing to production and during the period from start of lay to peak production.

It is better to prevent disease through vaccination, of course.

Do not introduce avibacterium positive birds and make sure your houses are vermin proof. Change clothes and footwear and wash your hands before entering the poultry house. If possible, do not allow workers to keep poultry at home.

To conclude, keep coryza away from your farm! ■

Vaccination for productivity

21

by Bart Stokvis, poultry veterinarian, Hendrix Genetics (bart.stokvis@hendrix-genetics.com)

Healthy birds are efficient producers, but how can we keep them healthy? ISA's breeding goal is to deliver commercial layers that can produce 500 good quality consumption eggs, without moulting.

Producing 500 eggs is possible under good management conditions. The basic requirements are a good microclimate in the house, good quality feed and drinking water and good feed management, correct lighting and continues litter management.

The introduction of pathogens should be prevented with a sufficient biosecurity program and a 'tailor made' vaccination program must be in place to protect against pathogens that cannot be excluded.

In layers, the main goal of vaccination is to protect the pullets against disease challenges during the production period.

Sometimes, protection during rearing is needed and in breeders, vaccination is used to supply a sufficient level of antibodies in the offspring.

Healthy, strong layers are made during rearing and during the first 12 weeks of the production period from good quality day old chicks.

Vaccination for productivity, in my opinion, means that you should vaccinate with the least damage to the growth of the birds.

You need layers on target body weight end of rearing, with good uniformity, to reach a good production peak and you must make sure they have a good first 12 weeks of production, without disturbance, to enable a good persistency of lay.

Bodyweight and uniformity end of rearing are related to the vaccination program applied.

It is very simple to grow layers according to the standards when the disease challenge is low and the vaccination program is short. It is sometimes even necessary to limit them in feeding under such circumstances, because they become too heavy.

Every time the birds are vaccinated they stop growing. This is because vaccines are not harmless. Vaccines challenge the birds to build up protection against pathogens and these immune responses cost energy.

In addition, some live attenuated vaccines induce mild disease symptoms, thus negatively influencing feed intake and growth.

Are (all) vaccinations really necessary?

You need to make choices and ask the following questions:

- What are the main threats?
- Against which pathogens must the program protect?
- Is it really necessary to vaccinate against a certain disease?
- What is the risk of the flock getting infected?
- What is the damage from an infection? If the risk of infection is big, but the consequences of an infection are small, you can decide to take this risk.
- Which vaccinations can be deleted from the program?
- Which live vaccinations can you combine?
- Handling the birds to administer vaccines is a big stress, so which vaccinations that require eye drop, injection or wing web as an application route can be combined?

An interesting new development are the vector vaccines based on Marek's HVT or avian pox virus, because they can replace several vaccinations with modified live vaccines.

The final goal is, where possible, to lower the number of vaccinations during rearing.

The period between, roughly, 18 and 30 weeks of age is the critical age period for a flock. Problems and disturbances at this age can damage the flock for life.

Therefore, it is recommended that you should not vaccinate during this age period. ■