

Cost Conundrum - poultry nutrition against feed costs

Feed prices increase and supply remains short. Changes are not expected to come soon, so new strategies have to be developed on how to deal with the issue. What can be done to optimise bird performance in a post-effective way?

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Not a day goes by without further bad news about rising feed costs, increased raw material prices or problems with supply. It seems that these are issues we are all going to have to cope with in the near future, and in the long-term we may have to adapt to a different 'climate' in animal production. The aim of this article is not to cover the reasons why we now face these problems or predict what may happen in the years to come. I would, however, like to work through strategies to optimise bird performance and health in light of current difficulties and a changing agricultural environment.

Getting the most out of feed

Efficient digestion and uptake of nutrients is the key to ensuring that the bird gets the most out of each ration, irrespective of formulation. Fortunately, major advances in enzyme and fermentation technology mean there are good commercial products available that can increase digestibility and nutrient availability. This is particularly important where poorer quality raw

With the help of SSF technology novel and locally available feed ingredients can be used efficiently in poultry rations.

materials or reduced specification diets containing by-products are used.

Recent advances in the use of in-feed enzymes and fermentation technology not only improve production levels, but also reduce variability in the performance of all types of poultry and allow the use of raw materials with lower nutritional values. Due to the economic climate and raw material availability, cereals typically used at the main energy ingredient in poultry diets are being replaced with by-products or lower grade raw materials. When using these fibre-rich ingredients, correct feed formulation is essential if bird performance is to be maintained.

New technologies

The benefits of enzyme supplementation are gained from the additional hydrolysis of the carbohydrate and protein, as well as increased availability of phosphorus, resulting in improved overall performance. As previously stated, the digestibility of

high-fibre or low quality diets poses a problem for poultry performance. The digestibility of complex carbohydrates, in particular, is associated with their structure, which in the case of non-starch polysaccharides (NSPs) are varied. Therefore, in order to break down this complicated structure a variety of modes of action are required to release the full nutrient value from different types of NSP.

However, cost-effective technologies are now commercially available and can be targeted to solve specific nutritional shortcomings in most by-products. One such technology is solid-state fermentation (SSF), which has been further developed by Alltech, where the fungus *Aspergillus niger* is grown directly on feed raw material substrate.

Solid state fermentation

Solid state fermentation systems provide different enzyme activities to those which are produced by conventional

enzyme cultures. Within the bird, feed is digested by a variety of enzymes, not just one, as this is a more effective method for digesting a variety of feedstuffs. Multiple enzymes work synergistically to increase nutrient release, improving growth and feed efficiency. With SSF technology available to produce an array of naturally-occurring enzymes, we now have an opportunity to get the most energy from conventional diets as well as those formulated with novel ingredients. Allzyme SSF® (ASSF), for example, has also been shown, through animal performance, to remain effective over a wide range of feed processing conditions. The product can be added directly to feed or via a premix, and no special application systems are required.

Using novel ingredients

In many cases, by-products can be successfully used in animal feed. For example, trials have been successfully carried out using distillers dried grain solubles (DDGS) in poultry rations.

Figure 1 is from a trial where diets containing high levels of DDGS were fed to broilers. The corn soybean meal reference (control) diet contained 22% crude protein (CP) and 3150 Kcal/kg of metabolisable energy (ME). The DDGS reference diet had the same nutrient levels as the previous diets but contained 25% of DDGS. The DDGS negative control diet had a 10% reduction in ME and 5% reduction in CP and the negative control + was the same except for the addition of 200g per tonne of ASSF. Both diets containing DDGS had poorer feed efficiencies than the control, but this effect, however, was reduced by the addition of ASSF.

Locally available cereals are also used around the world and the use of sorghum and sunflower is increasing in Europe. With the help of new technologies, these types of raw materials have the potential to increase their value for poultry diets. Fermentation technologies, such as SSF, offer an interesting approach for improving the digestibility and nutrient availability of such ingredients.

Reduced specification diets

Trials have been carried out to determine the effect of using solid state fermentation technology on broiler performance. Live weight gain was improved when ASSF was incorporated into corn/soya diets at both standard or reduced energy and phosphorus levels. Available metabolisable energy (AME) was reduced by 75 kcal per kg and available phosphorus (aP) was reduced by 0.1%. A positive effect was also seen in FCR when ASSF was added to the reduced specification diet (Figure 2). This data shows that bird performance can be maintained in low energy diets, with significant cost savings to the diet.

Phosphorus and calcium specification

Phytase enzymes release phosphorus from the phytate complex, but can only do so when the phytate molecule is exposed in the cell wall matrix. Phytate is found mostly in the cell wall matrix and is usually surrounded by fibrous cell wall material but may also be complexed with starch and protein. A variety of enzyme activities are required to break down the fibre, crude protein or starch complexes to release the phytate, allowing the phytases to liberate phosphorus and make it available to the bird.

A recent trial was carried out to evaluate



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the efficacy of ASSF in broiler production, using 1216 day-old mixed sex COBB 500 chicks. The control and experimental corn/soya diets were as follows; positive control (PC); PC + 200g of ASSF per tonne; negative control (NC); NC + 200g of ASSF per tonne. The NC diet was reduced in energy by 0.3 MJ/kg (75 kcal/kg), 0.1% available phosphorus and 0.1% calcium. Technical performance and economic benefits (Table 1) show significant (P<0.01) differences in the final body weight of the birds, with the highest found in the PC+ASSF group and the lowest in the NC group. Weight of birds in the NC+ASSF was numerically higher compared to PC however no statistical difference was found, as was the case with FCR. Calculation of the European Production Efficiency Factor (EPEF) revealed overall economic differences between the performance of the groups. The most important finding was that the PC and NC+ASSF groups had an almost equal EPEF but cost of feed per kg of live weight was less. This shows that it is possible to achieve similar production results with a reduced nutritive value of feed when ASSF is included in the diet and significant cost savings can be made as a result.

Range of strategies available

In the current grain supply market, reducing the reliance on high cost, high energy feed materials is a good way to maintain profitability for poultry producers. Therefore:

- Utilise locally available ingredients
- Consider the use of by- and co-products

Figure 1 - The effect of ASSF on FCR (gain:feed) of broiler chicks from day 1 to 21

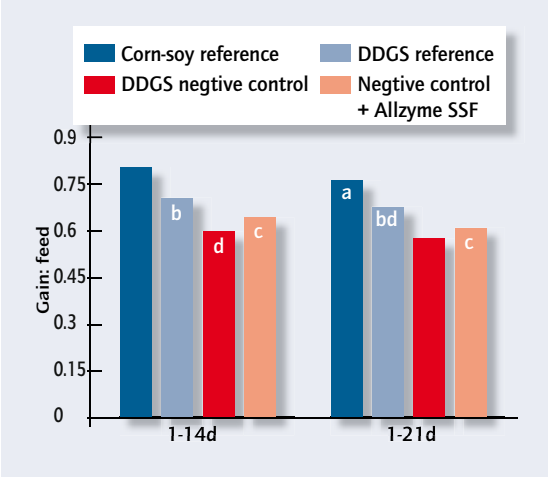


Figure 2 - FCR (mortality adjusted) of broilers aged 1 to 42 days fed corn/soya diets with variable energy and phosphorus levels, plus ASSF

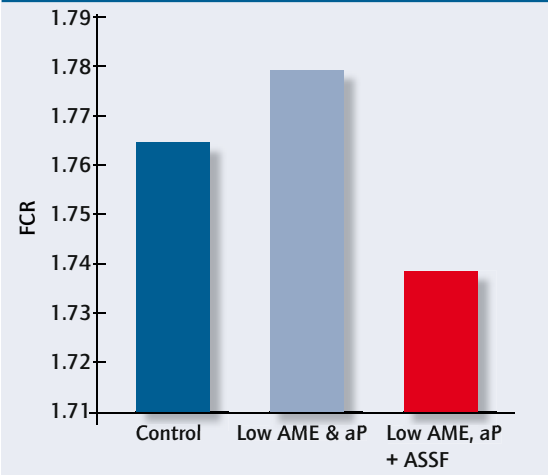


Table 1 - Performance and economic effect of ASSF on broilers at 42 days

| Group | PC | PC+ASSF | NC | NC+ASSF |
|---|--------------------|-------------------|-------------------|-------------------|
| Body weight at 6 weeks (g) | 2073 ^{bc} | 2160 ^a | 2066 ^c | 2105 ^b |
| FCR (6 weeks) | 1.96 | 1.93 | 1.99 | 1.96 |
| European Production Efficiency Factor | 246 | 256 | 239 | 245 |
| Cost of feed (€/broiler) | 1.496 | 1.544 | 1.451 | 1.466 |
| Cost of feed per kilogram liveweight (€/kg) | 0.722 | 0.715 | 0.702 | 0.696 |

^{a, b, c} Figures in the same row with different superscripts differ significantly

- Check your formulations, over and under specification can be equally costly
 - Make use of new technologies, such as ASSF, to get the most out of each ration
- However, if we decide to change the diet to use novel ingredients or reduce costs, we must also consider the health and welfare of the birds that we are feeding. As we all know a healthy bird will be much more profitable than a sick one. Knowledge of the interaction between nutrition and health is increasing all the time and it is a particularly important consideration when making significant changes to the diet. Birds fed a highly

digestible and nutritionally balanced diet have a healthier gut flora.

No easy solution

There is not one easy solution to this cost conundrum, not least because the rules of engagements are constantly changing. Poultry producers need to have a range of 'weapons' in their armory which can be brought out when required. We all know that 'fire-fighting' is not the most efficient way to manage business. Therefore, just like for fires, it is vital to have a plan and to test it; analyse novel ingredients, trial alternative formulations and assess new

technologies. Look at where savings can be made in each ration and particularly, see if you can reduce energy and phosphorus levels by increasing the digestibility of the diet. By improving digestibility, ASSF ensures that more nutrients are available for the growth of the bird. The products generated during the SSF process also allow for a more flexible approach to feed and diet reformulation through the inclusion of by-products or by reducing nutrient constraints in the diet; particularly energy, calcium and available phosphorus. ■

**Allzyme SSF® is not available for sale in the EU.*

Rising price of feed forces growers to seek alternatives

The price of poultry feed, particularly concentrates, continues to rise. Indonesian poultry farmers have asked the government for help, but are, in the meantime, looking for cheap alternatives.

By Joko Prihanto*

Ongoing increases in the price of poultry feed has thrown a number of poultry farmers in the area of Sukoharjo regency of Central Java, Indonesia, in a situation where bankruptcy is glooming. A local market analyst recorded in late 2007 that a 50 kg bag of feed cost Rp. 190,000 (€13.09) and in January Rp. 233,500 (€16.09). One month later farmers were expected to pay over 236,000 (€16.26). This upward trend has been evident for some time now and doesn't seem to come to a standstill. The situation has forced poultry producers in the region to ask the local government for help. A poultry farmer in the Sukoharjo regency of Central Java is one of them. Sustrisno, a 30-year-old resident of the village of Kagokan, is saying that the rise began early January and seems to go up continuously. He fears that he may have to close down his poultry operation, which has been running for years. "We are poor people and do not have financial reserves to stay in business till feed prices will come down," he said.

Dedy is a duck farmer in the region. This 29-year-old producer decided to look for alternative feed ingredients to keep the cost of feed down. He now buys concentrated feed in the retail shop at Rp. 5000 (€0.34) per kg. Although the



price is high he brings the final costs down through mixing this feed with cheap locally available rice bran. Other duck growers have taken on the tradition of herding flocks into the rice fields after harvest at noon. Here, the duck can feed themselves with rice, weeds and insects or snails. Despite these alternatives several duck farmers have been forced to close down and are no longer in business.

Government's role

Simple calculations show that the ever increasing cost of feedstuffs cannot be compensated by the current market price for meat and eggs. When asked for his comment the head of the Department of Agriculture of the Sukoharjo regency, Giyati, expressed that the rising price of poultry feed is caused by the withdrawal of subsidies implemented on imported raw feed ingredients by the national government. "This means that the price feed increase is felt nationwide. Cutting the subsidies is not the only reason for the price increase. The feed price is going up all over the world," Giyati continued. For

this reason he believes that the solution to the problem is in the hand of the national government. This does not say that farmers would have to wait for the government, but he encouraged farmers to look for alternatives, such as the use of locally produced feed ingredients. There are currently trials in Bendorari to find out what locally available feed ingredients can be used for and at what quantities. Giyati admits that the trial is a small-scale project, but he says that it is at least an approach that may lead to a promising alternative for the continuously increasing cost of imported feed ingredients. ■

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