

Calculating the impact of improved feed quality on bird performance

by Dr Kurt Richardson, Chief Science Officer, Anitox.

Pellet quality has a significant impact on feed intake and animal performance. It may surprise you, therefore, that many mills have the potential to significantly improve feed value with little or no additional cost. In fact, for many, improving milling efficiency could help reduce the cost of rations.

Feed form is known to have a significant impact on consumption with poor pellet quality resulting in the occurrence of fines that reduce feed intake. Recent research has shown significant effects of increased levels of fines on reducing liveweight and increasing FCR (Fig. 1).

Levels of fines tested

While most commercial broiler diets undergo pelleting, the durability of pellets can be variable with fines as high as 50%. Aviagen trials tested extreme levels of fines and levels commonly seen in the field to establish the modern broiler's response, in Western Europe using wheat-based rations and in Asia with a maize-based diet.

Both trials show that fines have a dramatic effect on bird performance with liveweight being reduced by up to 20% and FCR deteriorating by as much as 7%. Aviagen then used the data from the Asia trial to

calculate the economic effect of poor pellet quality. It determined that reducing fines to 0% gave an increase in bodyweight of 412g/bird.

To understand the value of that increase it used a liveweight price of \$0.71 per kg and established that the extra weight was worth over \$0.29 per bird, concluding that a 10% reduction in feed fines is potentially worth \$0.03 per bird in liveweight alone, excluding the effect on FCR.

We know that improving pellet durability is an effective means of reducing fines, and we can do that by manipulating diet formulation, using raw materials with good binding ability such as wheat, barley, rape, the addition of pellet binders, and improved feed manufacturing practice.

The four step process

Improvements can be made at every stage of the four-step pelleting process; grinding, conditioning, pressing and cooling/drying.

Grinding feed materials finely and evenly ensures uniformity of mixing, increases absorption of steam and increases digestibility of feed.



A finer, even grind results in better pellets and a faster, more energy efficient pelleting process.

As with grinding, conditioning significantly affects the physical quality of your pellets. Steam used during conditioning disrupts the structure of the starch, causing gelatinisation. It also plasticises proteins and softens fibres.

Increasing conditioning time and temperature improves gelatinisation in feed (Fig. 2). Gelatinisation enables feed particles to compress tightly and adhere to each

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Fig. 1. The influence of fine particles in the feed on broiler performance between 15-35 days of age (Quentin et al., 2004).

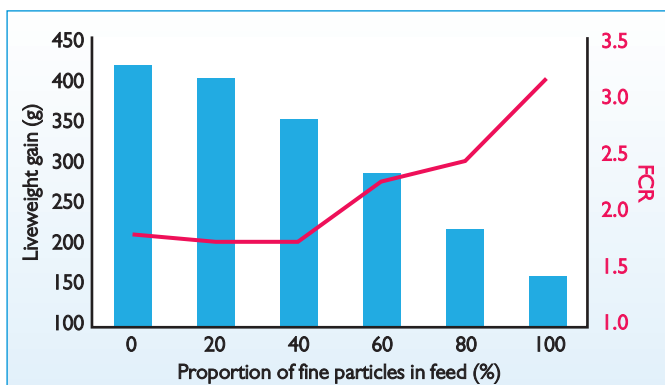
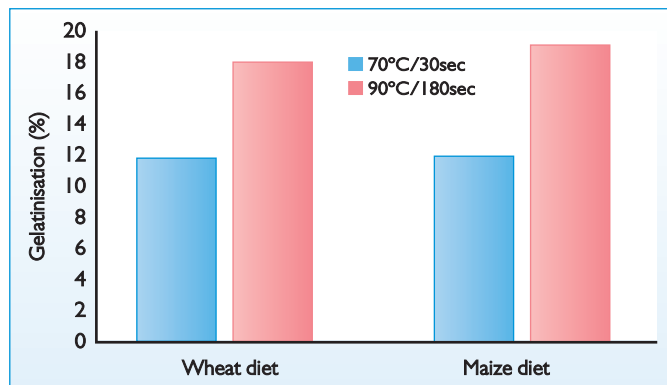


Fig. 2. The effect of different processing conditions on level of starch gelatinisation in two different diet types (Svihus, 2005).



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other when passing through the pellet die, and it is here that the value of milling efficiency solutions becomes evident.

Data from major poultry integrators reveals that the addition of Maxi-Mil, for example, increased starch gelatinisation by 23% to produce a more durable pellet with reduced levels of fines.

The presence of moisture in the conditioner allows for the transfer of heat into the feed particles.

Recent studies show Maxi-Mil's surfactant properties reduce the surface tension of added water, allowing a much faster permeation of the feed particles and greatly improve feed pellet quality.



As with grinding and conditioning, the pelleting procedure itself has an influence on pellet quality.

The best millers bring feed into the pelleter that has been correctly conditioned, enabling them to shape rather than force it

into pellets and so avoid friction heat at the die. Excess friction heat produces hard brittle pellets and can damage the nutrient value and availability of the feed.

Choice of ingredient mix impacts on pellet quality as well as feed cost. Different ingredients have different levels of pelleting ability and require different levels of conditioning to achieve optimum gelatinisation. But milling efficiency solutions give millers greater control – the addition of Maxi-Mil, for example, enables them to achieve a high quality, high nutrient value pellet from a less expensive ingredient pack.

Typical poultry diets are characterised as high-fat. The added fat will usually range from 2-5% and the total fat in the ration will be from 6.5-10%. When added at the mixer, the fat inhibits the process of thermal, compromising pellet quality. It serves as a barrier around feed particles, preventing moisture from entering at a rapid rate. The Pellet Durability Index of poultry feed can be vastly improved, therefore, by adding fat either at the pelleter or downstream of the cooler.

Optimising feed value

At Anitox our Maxi-Mil feed technicians and nutritionists are working to understand and manage moisture through the pelleting process to optimise feed value, and to better understand the consequential impact on flock performance.

We know, for example, that the addition of our moisture-mould inhibitors at recommended application rates does not dilute the nutrient profiles of finished feeds or adversely impact on palatability. That is important because studies show energy needed to manufacture feed can be decreased with the addition of a moisture-mould inhibitor, suggesting the potential to decrease pellet production cost.

Independent studies on that topic also confirm improved broiler liveweight gain, BW, and FCR. That is likely to be because of improvements in pellet quality and increased exposure to the organic acids present in the mould inhibitor throughout the starter and grower periods.

My advice to producers is to ask your feed processor about how they monitor pellet quality to ensure the rations your feeding remain whole from mill to feeder. The answer to that question will, after all, impact on your ability to maximise genetic potential of your birds. ■



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