

# Global Feed Phosphate Shortage

By the Aviagen Global Nutrition Team

## The Problem

In early January 2008, suppliers of feed phosphates announced to their customers that supply of phosphates would not be enough to meet orders from the animal feed industry. In some cases, only 30% of ordered tonnage is being supplied and it is expected that the crisis will continue until the end of March and maybe beyond. The following quote is taken from the Agricultural Industries Confederation (AIC) in the UK:

“One supplier has notified customers that it will only produce 30% of the normal monthly production for supply in January 2008, whilst a second is at 50 to 70% of usual January 2008 production levels and is shutting down its plant on the continent for 3 weeks in January 2008 due to no phosphoric acid as a raw material for feed phosphate production. As a consequence the feed phosphate suppliers are predicting their reduced supply will last a minimum until the end of March 2008.”

## Why is there a shortage?

The shortage is a result of exceptionally high demand for phosphorus containing fertilisers. Feed phosphates and fertilisers are both produced from a common raw material in phosphoric acid and extra fertiliser production has resulted in a shortage of availability of phosphoric acid for feed phosphate production.

The increase in fertiliser demand results from increased global plantings of cereals and plant protein crops in response to the shortage of global stocks and high prices being paid for cereals and plant proteins.

These global shortages result from a combination of increased global demand, poor harvests and the emergence of the bio-fuels industries which divert cereals and oil from plant protein sources into bio-ethanol and bio-diesel production.

## What are the implications for poultry production?

The two key affects on poultry production are:

- Difficulty in meeting phosphorus requirements of the birds.
- Further increased cost of feed.

This puts further pressure on feed formulation, as nutritionists look to conserve stocks of feed phosphates and keep formulation cost down. Shortage of supply of any material will result in the price of that material increasing and this is certainly the case with feed phosphates.

Nutritionists are attempting to conserve feed phosphate stocks using 2 methods:

- Reducing specification levels in feeds.
- Alternative ingredient inclusion strategies.

This will potentially have implications for production and it is worth considering how best the crisis should be managed.

## Reducing specification levels in feed

In normal situations, it is inadvisable to reduce phosphorus levels below recommended levels, but the current situation is not normal and this may be one course of action. When reducing phosphorus the following points should be considered:

- Broiler starter formulations should be left unchanged. Phosphorus levels are crucial for skeletal development **and growth** and any changes in specifications at this time can have serious implications for welfare and performance as the birds develop.
- If reducing the phosphorus levels of broiler feeds, it is best to consider reductions in the final withdrawal feed and working backwards towards the grower. This approach involves the least risk of negatively affecting bird welfare and performance. In terms of volume used the increasing feed intake of broilers during the latter phase of the grow-out cycle will result in a significant reduction of added phosphate usage.
- If considering reducing phosphorus specification levels, then consider the minimum level required; studies have shown broilers show deficiency symptoms at levels of available P of 0.29% of total diet (as is). However consideration should also be given to other factors influencing P requirements e.g. disease exposure, toxin levels in feed, susceptibility to rickets.
- If reducing phosphorus levels, it becomes even more important that the calcium:available phosphorus ratio is at the correct level (2:1). Therefore, calcium levels must be reduced to maintain the appropriate ratio. Consider the specification levels of other nutrients which effect bone mineralisation - calcium, magnesium, manganese and vitamin D3. Analogue forms of Vit D3 may be a more potent form of Vit D3. More recent work has indicated some omega 3 fatty acids improve bone mineralisation and growth.
- Matrix values for raw materials should be reviewed and adjusted appropriately according to quality control results.
- Formulating to digestible phosphorus can potentially reduce the volume of mineral phosphate required in the feed whilst maintaining correct formulation. However, anyone considering moving to this system from

an available system must take great care that the raw material matrix is amended appropriately.

- Breeder formulation specifications should only be considered if it becomes absolutely necessary. Low phosphorus levels will compromise egg shell quality, hatchability and progeny viability.

## Alternative ingredient inclusion strategies

The current situation regarding limited feed phosphate supply increases the benefit and value of phytase enzymes. The following points should be considered relating to phytase use:

- If adding phytase to diets that have previously not included phytase, the supplier of the enzyme should be consulted to ensure the raw material matrix and feed specification values for minerals are changed correctly for the enzyme being used. Consideration must be given to phosphorus, calcium, sodium and other minerals ensuring correct values have been ascribed to the product.
- Feeds already containing phytase may benefit from increased dosage of the enzyme. This benefit may be both in terms of phosphate sparing and cost saving. Again, if considering this option, the enzyme supplier/premix supplier should be consulted as to the best way to achieve maximum benefit and care must be taken to ensure the mineral content of the feed is kept in balance.
- When using phytase in breeder feeds, it is particularly important that the raw material matrix and specification levels are managed to keep mineral content balanced - particularly the calcium to phosphorus ratio.
- With more reliance on phytase as the 'source' of phosphorus in the feed consideration should be given to product stability.
- Emphasis should be placed on providing optimum phosphorus levels in the starter period.

- Ensure toxin levels are minimised and all other nutrient levels are as close to breeder recommendations as possible.
- Attention must be given to accuracy of inclusion of phytase into feed and there must be assurance that the phytase is blended into the feed in a homogenous manner.

Alternative sources of mineral phosphates may be available and offered for use. If these are to be considered, it is important to consider the following:

- The phosphorus and calcium contribution may not be the same as for the more traditional phosphates normally used, both in terms of absolute level and availability to the bird.
- Ensure that the mineral content of the material is fully understood (eg. sodium level) and entered correctly onto the raw material matrix with appropriate availability figures to allow correct evaluation of the value of the material.
- Ensure the quality of individual batches, to be certain that the correct level of minerals will be supplied to the birds.
- Watch out for heavy metal contamination in mineral phosphates offered.

### **Proactive approach**

- Implement a monitoring scheme by health experts/production staff. Monitoring young broilers for bone formation and signs of mineral deficiency related complications is advised.
- Monitor egg shell quality and productivity.
- Ensure feed intake is optimised so mineral intake is adequate.

### **Summary**

The current shortage of supply of phosphates is a further challenge to feed formulation and production of poultry. It is extremely important that the problem is managed in the best way possible:

- Carefully manage reductions in phosphorus levels in broiler feeds. Maintain levels in starter feeds and focus on withdrawal and finisher diets to reduce phosphorus level.
- Exercise extreme caution with broiler breeder feeds, both in rear and production, to avoid production problems.
- Maintain calcium:available phosphorus ratios.
- Review mineral values on the raw material matrix.
- Take advice on phytase use from the manufacturer.
- Be cautious in the use of alternative phosphate materials - monitor quality.
- Proactive approach - monitor and assess bird condition and egg shell quality.

Finally, it is important to remember that when phosphate supply returns to normal the formulations should be reviewed and mineral specifications returned to standard levels to ensure optimum performance, health and welfare are achieved.