Additive premixtures in egg production

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Eggs have come under scrutiny from governments and consumers for many years. With antibiotics once again under the spotlight it is imperative that satisfactory alternatives are identified to maintain productivity and freedom from disease.

Profitability relies on quality genetics and good feed materials but the farmer bears the brunt of the responsibility in terms of biosecurity, welfare and microbiology.

Producers need to know what products are available to help them and, perhaps, more importantly, what these products do.

I came across one producer who had been wooed by the salesmen and had seen his feed costs steadily rise until profitability was a distant memory.

When I checked his feed formulation he had a string of additives in the feed:

- There were two toxin binders, yet there was no evidence of mycotoxins in the feed.
- There was a mould inhibitor but the feed was consumed within two days of production under dry storage conditions.
- There was an acidifier.
- There was a prebiotic (fructo-oligosaccharide).
- There was a yeast product for boosting immunity and binding pathogens.
- There was humic acid for boosting immunity and enhancing digestibility.
- There was a growth promoter to promote growth and control clostridium.

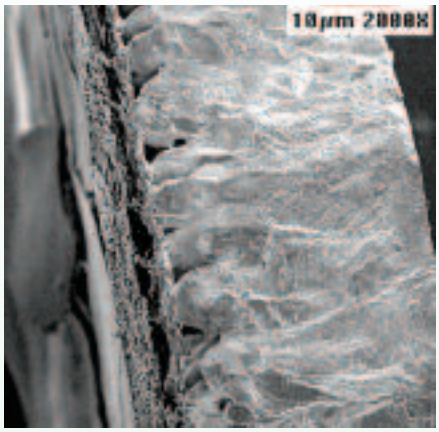
With no mycotoxins there was no need for the toxin binders and with insignificant storage times between production and feeding there was little need for a mould inhibitor.

The acidifier was required to control pathogens in the gut. In poultry acidifiers are especially useful for breeders and layers, but I will come onto that later. The prebiotic helps maintain a healthy gut microflora in the hindgut.

The immune system of a healthy adult bird should not need boosting, especially if some alternative form of pathogen control is in place.

Similarly, the passive pathogen binding activity of the yeast is not required if active pathogen control measures are already in place (acidifier and prebiotic).

Humic acid may provide an immunity boost but this should not be required in a healthy layer unless there are extreme stress factors such as point-of-lay or force moulting.



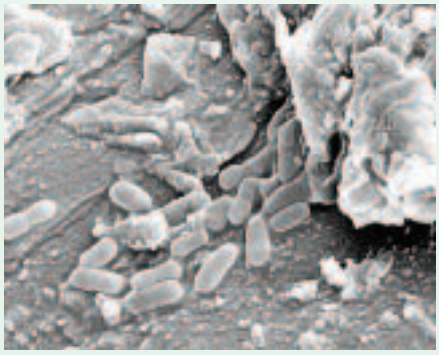
Egg shell quality is improved with acids.

The growth promoter would have offered certain benefits but all growth promoters are to be banned in just a few months, hence the need for alternatives.

The anti-clostridial activity of growth promoters can be partially provided by prebiotic stimulation of healthy gut microflora in the hindgut and butyrates that are known to help regeneration of damaged mucosal membranes in the gut.

The moral here is to buy only what you need and not what people are trying to sell you!

Probiotic species readily colonise acidified carriers.



Let us examine what some of these feed additives can do.

Toxin binders like Agil's Sorbatox are valuable if you are at risk, or suspect that you are at risk, from mouldy raw materials or finished feeds. If you are sure of your quality, and check for mycotoxins regularly, then you do not need one.

Mould inhibitors like Mycostat are vital if you intend to store feed for more than a few days.

Feed bins are especially vulnerable to mould contamination due to 'cold bridges' where condensation forms on the metal sides of feed bins.

Acidifiers can help to overcome the buffering effect of feed. This is especially important in egg production where high levels of the alkaline salt – calcium carbonate (limestone) is added to ensure that there is sufficient calcium in the diet to maintain egg shell quality.

Calcium availability can be increased from 47 to 55% bioavailability simply by improving the acidity in the intestine.

In a recent report from the United States the number of shell eggs broken totalled 169 million dozen during December 2004 – up 7% from just one year ago. Acidifiers also reduced the risk of salmonellosis and salmonellosis compromises shell integrity leading to hairline fractures.

There are, therefore, two very good reasons to use acidifiers in layers and breeders.

Acidifiers can reduce the risk of pathogen recolonisation of the feed by salmonella and E. coli after heat treatment.

If no heat treatment is involved then these organic acids will reduce pathogen levels to ensure that the feed consumed is as biologically clean as possible.

Acidifiers come in three distinct forms. Liquid products are effective in the feed but are digested immediately after being consumed by the bird.

Acid salts like calcium formate and calcium propionate have little effect in the feed as they are non-volatile and have a neutral pH.

Protected acids are liquid products, partially buffered, on a mineral carrier.

These products actually release acid vapours into the feed like liquid products but then retain their activity in the gut.

Continued on page 15

Continued from page 13

Products like Salkil have well documented trials showing a direct impact on the intestinal microflora in terms of reduced salmonella counts and improved acidity in the hindgut.

This is achieved by the acidified carrier being used as a support medium for the acid tolerant and acid producing bacteria in the gut and allowing them to grow. In the same way that probiotics exclude the non-acid tolerant pathogens from the gut by producing lactic acid.

A red mite colony on a drinker. If you find red mite – you have a problem!

Salkil should be used in layer and breeder feed at 2kg/Te to combat the risk of salmonellosis, to assist in calcium absorption and to improve eggshell quality.

Prebiotics come in two forms. Fructo-oligosaccharides are complex sugars that are not metabolised by the host animal but can be fermented by acidophilic bacteria in the hindgut. This helps maintain the low pH environment necessary for pathogen reduction and calcium availability.

Such oligosaccharides often show their greatest activity in mammalian species where bifidobacteria, found widely during the pre-wean stages, are present in the intestine but require an additional fermentable carbohydrate source after weaning to continue their protective role in the gut.

Mannan oligosaccharides are generally derived from the cell walls of yeast species. They simulate the receptor sites on the intestinal mucosa that is colonised by pathogens.

In this way the pathogens colonise the mannan-oligosaccharides and are flushed from the intestine.

'Biological' control systems come in two forms. Vaccination has been hailed as the great success story to control salmonellae.

Vaccines are serotype specific and there are over 1600 serotypes. salmonella vaccines have no effect on other enteropathogen species such as E. coli and campylobacter and the concern here is that removal of one serotype increases the opportunity for another.

The control of Salmonella pullorum and S. gallinarum (two poultry pathogens) from European flocks left an opportunity for S. enteritidis (a human pathogen).

It must always be remembered that simply killing a single target species or group does not protect the flock from all pathogens.

Competitive exclusion products used in conjunction with a Salmonella typhimurium live vaccine did not improve efficacy, but sterilisation of drinking water did tend to improve efficacy.

Most drinking water on farm is stored in overhead tanks and is not piped from the mains supply directly to individual drinkers.

There is, therefore, a high risk of organic contamination from dust and bio film, which can in turn support enteropathogen challenge.

Treatment with sodium troclosene (Credence) tablets is a safe and simple technique that effectively eliminates drinking water as a source of infection.

Insect pests, especially blood sucking mites such as the red mite, should be controlled using chemical free pesticides such as MiteX, a diatomaceous earth product.

We must consider how to satisfy the Code of Practice for Lion Eggs where we find statements like:

1"Feed for pullets and layers must be produced, stored and transported under hygienic conditions and must be protected throughout to avoid the risk of contamination and/or spoilage."

This allows for acidifiers to be used to prevent recontamination.

1"Growth promoting substances must not be included in the feed."

Antibiotics cannot be used, however some control mechanism against enteropathogens is still required.

Control mechanisms that are free from residues and resistance with no risk of toxicity and no withdrawal period have a definite place in layer and breeder feeding. Feed acidification using protected acids on carriers satisfies all these requirements.

1"All appropriate measures must be taken to prevent the recontamination of feed during its storage and distribution on the farm. Particular attention must be paid to the cleanliness of bulk storage bins, augers, hoppers and chain or spiral feeders."

Again acidifiers can do this especially where the acid blends contain propionic acid, which is the best known anti-mould agent.

1"All appropriate measures must be taken where possible to prevent cross contamination of feed by medicines."

Acidifiers are not classified as medicines. Some products contain formaldehyde, which is now a recognised carcinogen according to the International Agency for Research on Cancer.

1"Pesticide and residue testing must be carried out on finished feed and raw materials."

MiteX is a non-chemical pesticide for layers and breeders that acts in a purely physical manner.

Several proprietary products will kill potential Gram negative enteropathogens in the feed, but a 95% kill in 24 hours is insufficient to decontaminate an infected feed. For example an infected feed could easily contain 10^6 (one million) bacteria per gram, so a 95% kill would still leave 50,000!

No chemical treatment can be relied upon to rectify poor production quality. However, acids will prevent recontamination of well produced feeds and slowly reduce the overall bacterial loading.

The problem on farm is much more complex. Feed is possibly one of the least important sources of infection.

Many of the sources are well documented but visitors, including veterinarians and salesmen, water supplies and insects must not be overlooked.

In nature the bird relies on the acidity in the crop to reduce bacterial loading in the gut by killing enteropathogens as they enter via the oral route.

In intensive production the high feed volumes in pullet production and the high limestone content of feeds for breeders and layers reduces the efficacy of this barrier.

When these natural acid levels are compromised salmonellae and pathogenic E. coli can pass through the crop to colonise the gut wherever the pH is favourable.

In commercial trials Salkil has been rigorously tested and shown to reduce intestinal pathogens and, therefore, it has benefited the farmer by greater economic returns.

Shell quality can be improved and feed efficiency optimised with correct acidification, whilst Credence and MiteX can improve water quality and insect vector challenge respectively. n