End product safety – controls on the farm

Consumerism is putting an ever increasing pressure on farmers and food producers to provide them with the safest possible food. This is putting a requirement on everyone in the food chain – the supermarket, the processor, the grower, the breeder, the hatchery and the feed mill – to do all they can to help achieve this goal.

If we look at food safety in general terms, we are talking about keeping our birds free of zoonotic pathogens and harmful chemicals. Some would also add allergens and GMOs to this list but in practice these are not an issue at farm level.

Certain niche sectors require their birds to be reared in a GMO free environment eating GMO free feed and in this situation it can become an issue although there is absolutely no evidence to suggest that feeding GMOs to birds has any adverse effects on the person eating that chicken or the eggs derived from it.

This article is, therefore, going to focus on zoonotic pathogens and harmful chemicals.

Zoonotic pathogens

So, what is a zoonotic pathogen?

A pathogen is a micro-organism that is capable of causing disease and a zoonosis is a disease capable of moving from animals to man.

Thus, a zoonotic pathogen is a disease causing organism that is found in animals that is capable of being transferred to man. Two very good examples, both of which are found in poultry, are salmonella and campylobacter.

Zoonotic pathogen control is basically starting with a clean farm, putting zoonotic pathogen free chicks on the farm and then keeping them free of such organisms.

Let us just stop here and reflect on this statement.

For somebody to go down with food poisoning they need to consume adequate numbers of the zoonotic pathogen. This is known as the infective dose.

Thus, it can be argued that minimisation of the numbers of a zoonotic pathogen rather than its total elimination is all that is required.

This is dangerous logic to follow because low numbers of, say, salmonella in birds

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going into a processing plant do not necessarily correlate with low numbers on the purchased meat product.

This is because salmonella can multiply on products and this is accelerated if the product is subjected to temperature abuse anywhere between the processing plant and the consumer's plate. In such a scenario the chicken is taking salmonella into the consumer's kitchen and this must be very undesirable.

Yes, cooking will kill off salmonella, but consumers are very adept at doing what they should not do. A good example of this is putting a raw chicken in its bag immediately above a food in the fridge that will not be cooked, for example, salad, cheesecake or a trifle, and the juices from the chicken dripping on to that food!

Another situation that occurs is slicing the cooked product on a drainer on which raw product was previously handled and has not been adequately cleaned and sanitised!

Vertical transmission

As far as salmonella is concerned the organism can be transmitted vertically, that is on or in the egg, from the hen to her offspring and so salmonella free breeder flocks are an essential pre-requisite to having salmonella free broiler or table egg flocks.

The two main salmonellas of concern are Salmonella enteritidis and S. typhimurium and both of these can be easily transmitted on or in the egg.

This then begs another question and that is do we want to be free from all salmonellas or just these two serotypes?

If we say just these two serotypes then this begs the question whether there should be a third, for example, S. virchow, or a fourth and so on. In reality it would be prudent to stick to just the first two.

Obviously total freedom is the idealistic goal, but if we are giving guarantees is it better to just focus on S. enteritidis and S. typhimurium?

The answer is probably yes, especially as we have vaccines for these two serotypes that we can use at breeder and commercial level.

A key attribute of such vaccines when they are used in breeders is that they greatly reduce vertical transmission of salmonella. Controlling this vertical transmission is a key component of salmonella control.

There is some research coming out of the USA which does beg the question whether vertical transmission plays a role in the epidemiology of campylobacter.

Salmonella free farm

Whether we are talking at breeder level or commercial level a key aspect to keeping salmonella out of our birds is to start with a salmonella free farm.

Interesting data from the UK (Table 1) gives us something to reflect on here.

In the UK farms whose flocks had been removed under the salmonella legislation for S. enteritidis/typhimurium control were being cleaned and disinfected, tested and, on being found to be negative, restocked.

A proportion of these farms subsequently went down with salmonella again.

Somebody then thought what is the situation if we test this type of farm at ten times the sampling level?

Thus, the levels of sampling on farms A to

Table 1. British Defra data on sensitivity of terminal disinfection.

Farm	Number of samples	Positive for salmonella (%)
A	200	15.0
B	300	35.0
C	220	9.0
D	300	1.3
E	220	4.5
F	250	15.0
G	220	0.9
H	300	0
I	300	5.6
J	300	12.0
K	300	0.3

K in Table 1 are at 10 times the then recommended sampling level.

Farms from which more than 10% of samples tested positive would have been detected under the then existing statutory testing programme but those yielding under 10% positive samples would have very likely been declared negative.

Thus, six, possibly seven, of the 11 farms in this trial were positive but would have been declared negative according to the statutory testing protocol.

Only one farm (H) appeared to be truly negative although one has to wonder what its status would have been if there had been a further tenfold increase in the sampling intensity.

Thus, we are looking for the proverbial 'needle in the haystack' and this then highlights the danger of declaring one's self free of something like salmonella

For something like salmonella you are much safer declaring what you have done in the way of testing and then letting the other party decide on the interpretation.

For example, 'we test a pooled sample of 60 cloacal swabs every two months and on this farm no S. enteritidis has been found in this cycle of egg production'. Read this last phrase very carefully to appreciate the subtleties in it!

Entry on to the farm

Then we need to look at everything coming on to the farm, or more precisely going into our poultry houses and make sure it does not carry a zoonotic pathogen into our birds.

Something as basic as double boot dipping, operating a dirty/clean dividing barrier at the house entrance and changing into overalls that are dedicated to a particular house have been shown to have a really significant impact on campylobacter prevalence in broilers.

Obviously zoonotic pathogen control has associated costs. So, there is an argument that whether or not we do such things is dependent upon our customer's wishes.

However, an attitude is beginning to come from customers that they expect zoonotic pathogen control to be part of normal management and, as such, is the producer's costs.

Chemical contamination

Let us now reflect on chemical contamination. Usually, chemical contamination is the result of ingestion of the contaminant by the birds so we need to focus very strongly on the quality of our feed, water and bedding material.

On rare occasions contamination can occur by other means. For example, some disinfectants if left on the live bird lorry can be absorbed through the birds' skin while birds are being shipped to the processing plant. Hence, rinsing is an important stage of lorry cleaning.

Much of the avoidance of chemical contamination is, therefore, in the hands of the feed mill that supplies our birds' feed.

We should remember when using in feed medication to respect their withdrawal periods.

Ideally this is done by using the two feed bin approach so that the phenomenon of coning can not occur. If we only have one feed bin we need to be aware of this phenomenon and do all we can to ensure it does not occur.

However, there are too important areas that we can manage on the farm. These are the use of antibiotics via the water system and the management of our water system.

Thus, we need an effective traceability system for al chemicals and medicines coming on to the farm so that we know and can prove what came on to the farm, where it went and when and how it was used and that all requirements, such as withdrawal periods were adhered to.

This then needs to be encapsulated in a robust recording system.

So, whether we are talking about chemicals or zoonotic pathogens several common themes occur.

These include know your hazards, know what is happening, traceability, defined management/control processes, records and transparency. ■