International Poultry Production

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Salmonella VI

Salmonella control

Salmonella control centres around the successful combination of several strategies, namely providing salmonella-free day-old chicks and feed to the farm; effective biosecurity to keep salmonella out of the flock; managing the gut microflora so that it is best able to counter salmonella infection (colonisation); and vaccination. Then, on top of this, we must have a robust monitoring system that can tell us what the true salmonella status of our flocks really is.

Hatching eggs and day-old chicks

The cornerstone to any salmonella control programme is to be able to regularly provide and place salmonella-free day-old chicks and this necessitates salmonella free breeder flocks and regularly monitoring these to confirm that this status is being maintained. Specifically, we need to produce clean hatching eggs that are regularly collected from the nest boxes and then disinfected or fumigated.

At breeder level there is a conundrum with vaccination, in that vaccination reduces the level and degree of salmonella shedding from a flock so that this process can, conceivably, reduce the level of salmonella to below the level where routine testing could detect it. On the other hand, vaccination greatly reduces vertical transmission. In practice this is addressed by vaccinating commercial parent stock flocks but, as we ascend the breeder pyramid, reducing the reliance on vaccination and placing more emphasis on feed management, biosecurity and other aspects of salmonella control is more important.

Risk of spreading salmonella from an undetected positive breeder flock is further minimised by streaming the eggs from a flock. Ideally, enough eggs should be placed in a single stage incubator to provide enough chicks for one broiler house.

Controlling salmonella in feed

Feed is a well known route by which salmonella gets on to the poultry farm. So, management has the responsibility of producing salmonella negative feed and ensuring that its status is not compromised between the feed mill and the farm.

There is not much point in spending a lot of time, effort and money to produce salmonella negative feed only to go and put it in an open lorry that does not have its tarpaulin on overnight and becomes contaminated by pigeon droppings (pigeons are notorious carriers of Salmonella typhimurium).

The key strategies to obtain salmonella-free feed are to source known salmonella-free ingredients; heat treatment of the feed; chemical treatment of the feed by acids or formalin containing compounds; and avoiding its recontamination after the feed has been produced.

Biosecurity

Everything coming on to the farm has the potential to bring salmonella with it and the closer that any item gets to the birds the greater the risk that the birds will be contaminated. For this reason only an essential item should be allowed into the poultry house and then only after it has been subjected to processes that will ideally eliminate, but more likely greatly minimise, the number of salmonella organisms present on or in it.

Feed and water present the greatest risk, closely followed by bedding material, as every bird eats and drinks everyday and, in the case of bedding material, picks through it. In this context the practice of floor feeding warrants consideration because it encourages birds to scratch through the litter and increases the accidental consumption of litter. Water should come from a clean source and ideally should be chlorinated.

Managing the gut flora

In order to infect or colonise the digestive tract of the bird salmonella needs to occupy places (receptor sites) on the surface of the intestinal tract. If we can swamp the digestive bacteria with 'good bacteria' then these will occupy these sites and make them unavailable for salmonella bacteria that will then not be able to colonise or infect the birds. This process is known as competitive exclusion and we can use this in poultry production.

There are two times when the beneficial bacterial population in the bird's digestive tract is reduced. These are immediately after hatching and following treatment with antibiotic(s). In these situations the use of a competitive exclusion product may be beneficial. In the day-old chick additional protection can also be provided from maternal immunity acquired from vaccinating the breeder hen.

Vaccination

Vaccination at commercial level is an important control tool, especially to control infections by Salmonella enteritidis and S. typhimurium (and for controlling pullorum disease and fowl typhoid in areas where these are still a problem). There is a hidden benefit in that vaccines tend to cross protect within serogroup. Thus, S. typhimurium vaccine not only protects against S. typhimurium but also against the other serogroup B salmonellas. The same occurs with S. enteritidis and other serogroup D salmonellas.

Vaccination has two purposes. Firstly, it protects the vaccinated birds against infection and, in doing this, greatly reduces horizontal (bird to bird) and vertical (bird to egg and hence to chick) spread. Secondly, as mentioned earlier, if we vaccinate breeders we confer protective maternal immunity on to the chicks produced.