Testing to determine the microbiological status of day old poults

When poults arrive on farm they should be free from physical defects, actively looking for feed and water, able to respond to changes in temperature and generally exhibit typical behaviour. In addition, they should be free from zoonotic infections and pathogenic organisms that can result in disease or poor performance.

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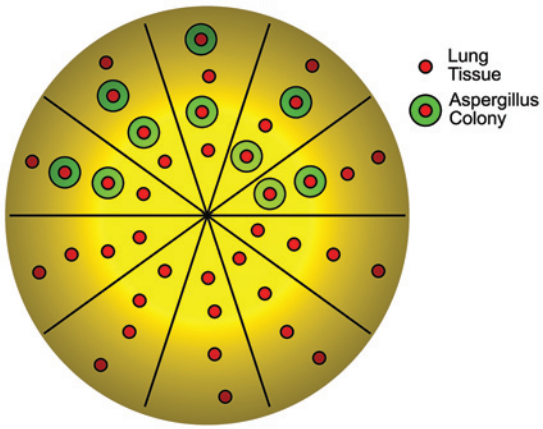
However, poults will never be sterile. Poults are hatched from an egg which is laid via the cloaca of the hen. The cloaca has a huge microbial population (~10^9 bacteria per gram of faeces) to which the egg is exposed when it is being laid. The egg surface will be heavily contaminated with these organisms and, despite egg sanitation procedures, some of these bacteria will persist through to the hatching stage where they will contribute to the formation of the gut flora of the newly hatched poults. The presence of 'normal' gut flora at delivery is not a cause for concern, or for the use of antibiotics, unless it is linked to clinical disease in a significant number of poults in the first few days of life. This will usually take the form of omphalitis, yolk sac infection or bacterial septicaemia.

Some organisms should not be present at any level in the poults leaving the hatchery. These include avian influenza virus (AI), the avian pathogenic mycoplasmas (M. gallisepticum, M. synoviae, M. meleagridis and M. iowae) and salmonellas, particularly those that are primary avian pathogens or are of human health significance. Most of these are covered by intracommunity trade legislation which requires turkey breeder flocks to be free from notifiable AI and ND, S. pullorum/gallinarum, S. arizonae, Mg and Mm.



Method to determine increased risk of aspergillosis

From 10 poults take four pieces of lung tissue (two from each lung) the size of a pin head and place on Sabouraud agar as shown opposite.

If at least five poults have two or more positive lung samples then there is an increased risk of aspergillosis in the flock.

Fig. 1. An example of a published method used to predict the likelihood of aspergillosis (Hamet. N, 1990).

Hatchery environment

The warm and humid hatchery environment provides ideal conditions for the survival of a number of environmental organisms aside from those that are part of the normal flora of the hen. These include Pseudomonas sp and Aspergillus fumigatus.

These organisms can enter the hatchery on the eggs from the farm environment or via a number of other routes from the external environment. The modern hatchery sanitation programmes are designed to keep these and other potentially infectious organisms under control but are unlikely to eliminate them entirely.

The aim of the hatchery sanitation procedures should be to limit the exposure of the eggs to these organisms in order to prevent the contamination of the developing embryo or newly hatched poult. High levels of challenge can result in infection of the embryo within the egg or an overwhelming challenge at hatch.

Transmission of infection from the breeder farm can occur due to the true vertical transmission of poultry pathogens in the egg, such as mycoplasmas and salmonellas etc, or through contamination of the egg shell on the farm, for example salmonellas. The use of these eggs can result in increased risk of overwhelming challenge at hatching leading to clinical disease.

The hatchery can pose a challenge through a variety of micro-organisms during incubation/hatching if inadequate management procedures are followed.

Excellent hygiene is required if interventions such as in-ovo vaccination, toe trimming, beak trimming and de-snooding are carried out at the hatchery as these provide a break in the poults' defences through which bacteria can pass, for example Staphylococcus aureus.

Organisms likely to be present in day old poults

During hatching and processing, the poults will be exposed to bacteria which have survived in or on the egg despite egg

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sanitation procedures. These are likely to include bacteria that make up the 'normal' flora of the breeder hen, namely clostridia, lactobacilli, bacterioides, E. coli enterococci, etc.

In addition to the normal egg flora the poults will also be exposed to the environmental organisms that survive the hatchery sanitation procedures – these can include Pseudomonas sp and Aspergillus fumigatus. The detection of low levels of these organisms in healthy poults at delivery is not an immediate cause for concern.

The poults are also likely to be exposed to these organisms on arrival at the farm as they are likely to form part of the environmental flora on any poultry site.

Testing day old poults

Any sampling strategy should be determined by the type of organism, the route of infection and the likely transmission rate.

Salmonella

Sampling the poult transport materials (poult box liners) can provide a good composite sample to determine the status of the poults being received. To maintain the confidence of both the breeder and the farmer this sample is best taken on the delivery vehicle before the boxes in question enter the house, as boxes/poults can become contaminated in the first few minutes on a farm that has not been adequately cleaned and disinfected.

Mycoplasmas

The best protection against receiving poults infected with mycoplasma is to source the poults from a reputable hatchery that guarantees freedom from infection. Testing at day old is very unreliable for a number of reasons. Serological tests are prone to false positive reactions; PCR and culture are highly unlikely to detect the presence of any mycoplasmas given the low transmission rate, number of source flocks and very small sample sizes usually involved. Farmers/companies that source flocks from a number of different hatcheries frequently carry out testing at placement. In these circumstances it is important that limitations of the testing regimes and the tests themselves are understood by their veterinary advisors and that positive results are confirmed by follow up testing.

Aspergillus

Testing simply for the presence or absence of Aspergillus sp is of limited use given the widespread distribution of this organism. Any testing for the organism needs to give some measure of the potential for disease being caused i.e. it needs to be quantitative. The isolation of Aspergillus fumigatus does not mean the poults have aspergillosis. Aspergillosis cannot be treated with antibiotics.

Post mortems

Monitoring mortality and responding rapidly to unusual or increased mortality is an extremely effective way of determining if hatchery related infections are occurring and allow for early appropriate intervention if it is required. Where possible, antibiotic sensitivity testing should be carried out to help determine what antibiotics are effective.

Conclusion

The practice of culling and testing day old poults occurs regularly in those markets where independent farmers source poults from a number of hatcheries, who may in turn have sourced eggs from a number of companies. It is important that positive results for either salmonella or mycoplamsas are confirmed – the sampling process needs to be carefully carried out and a laboratory with good quality control systems should be used. Overall, the decision to carry out testing to determine the microbiological status of poults and how the results are used needs to be based on accurate science, otherwise the procedure is largely ineffective and simply another cost. ■