

Vaccinations: what and why?

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One of the earliest purposes of vaccinating animals was to protect public health. This is still one of the reasons dogs are vaccinated against rabies before returning to the UK. However, their typical use is to prevent and control disease in animals.

Vaccinations are a simple, safe, and effective way of protecting animals against harmful diseases and they form a key role in managing animal health and welfare. Vaccines are used to modify the body's natural defences to specific infections and make the immune system respond appropriately as and when required. Vaccinations train the immune system to create antibodies, just as it does when it's exposed to a disease, which allows the body to be prepared in the future. However, because vaccines contain only killed or weakened forms of the pathogen such as viruses or bacteria, they do not activate the disease.

Vaccination is a cost-effective method of preventing animal diseases. Vaccines are generally safe, efficacious, and are associated with very few side effects in comparison with the disease itself.

Vaccination programmes play an important part of veterinary health plans and should be in place to ensure that livestock herds and profits are well managed. Vaccination increases immunity, reduces the impact of subclinical disease, reduces the spread of disease, and can also be used to eradicate disease. Vaccinations also help in reducing morbidity and mortality in farms and contribute to improving animal welfare.



There are several different types of vaccines in use:

1. Modified live (attenuated) vaccines contain a weakened version of the pathogen, so it can stimulate an immune response without causing disease.
2. Killed (inactivated) vaccines contain a completely inactivated pathogen which is no longer able to cause disease. However, with the help of an adjuvant, it can provide disease protection.
3. Recombinant vaccines are produced using specific material from the pathogen to stimulate an immune response when injected into the animal.
4. Toxoids are vaccines based on inactivated toxins produced by the pathogen causing the disease.

Innovation such as Sci-Tech's DIVA testing service has also resulted in marker vaccines being developed that will allow subsequent testing of the animal to identify whether the animal had been naturally infected or vaccinated. This can be very useful in disease monitoring programs.

To get the best response from a vaccine, it is best not to vaccinate animals that are in poor health, have poor body condition or are stressed because the vaccine will not be as effective.

It is important to follow the manufacturers' recommendations regarding dose regimes and administration guidelines such as using the right needle and the correct route of administration e.g. subcutaneous, intramuscular, or intradermal. Good hygienic practices are also vital to limit injection site reactions.

In summary, vaccines play a vital role in the long-term solutions for effective control and prevention of existing and developing infectious diseases. When they are used appropriately, they can prevent disease and help to reduce antimicrobial use as fewer treatments will be required.

Coccidiosis in poultry

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Coccidiosis is an endemic problem in the poultry industry today. In fact, it is known to affect every species of animal on Earth.

It is caused by a parasite known as Eimeria, which enters an environment in the litter of an infected host. Eimeria is ingested when the birds peck into the litter in the sheds. It then populates the intestines and causes infection.

The first attempt at treatment in poultry was around 60 years ago, but the disease is still a problem today. We must look at the lifecycle of coccidiosis to understand how to control this parasite. It starts with what is known as an unsporulated oocyst. This oocyst carries the causative agent for coccidiosis but is not yet infectious. Once the oocyst has sporulated inside the bird, it will then initiate the parasitic infection. They are very difficult to eliminate due to the presence of a thick cell wall which protects the parasite and is resistant to disinfection, heat, and cold.

The effects of coccidiosis

When a bird is infected by Eimeria, clinical signs emerge as reduced consumption of feed and water, enteritis, diarrhoea, and increased mortality. This has a negative impact on the health and economic viability of the flock. Even if the flock is treated, there is a slow recovery period for the birds. The screening of flocks and early diagnosis of the parasite is of prime importance, as well as initial measures to prevent infection. However, this is not always effective.

Once Eimeria is present in a shed it is difficult to eradicate. It is contained in the litter and is ingested by the birds, which then leads to destruction of the intestinal mucosa. In turn, this reduces the nutrient absorption by the bird and causes diarrhoea, which can then spread the Eimeria and trigger repeat infections. Coccidiosis is only treatable with high-cost medication.

Control of coccidiosis

There are several vaccines that will control infection by introducing a low dose of the live parasite to induce immunity. This is a good prevention process, but care must be taken because it may not be effective if the birds are already under challenges from other infectious agents or are suppressed for other reasons.

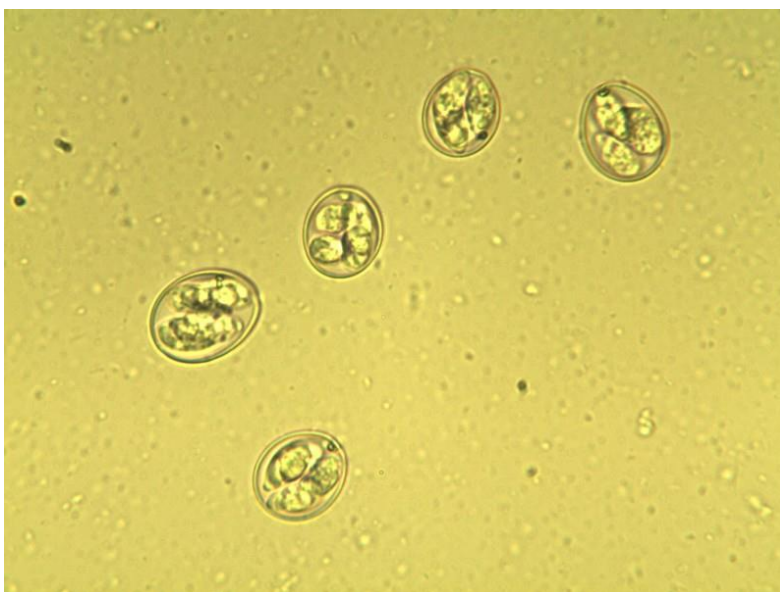
Vaccination must be carried out uniformly with a suitable dose applied to each bird. Otherwise, the vaccination process will break down. This should be discussed in greater detail with a veterinary professional.

Methods for screening

The McMasters flotation technique and subsequent microscopy is the established method for screening coccidial oocysts and worm egg counts. This system is used to measure the parasite count in poultry sheds. It is good practice in larger sheds to take multiple faecal/litter samples to get a picture of the overall situation.

Once microscopy screening is carried out at the laboratory, the results are calculated and reported to help poultry farmers make informed decisions on how to manage the disease. The following limits are generally applicable, but it would be worth discussing further with your poultry vet.

Level	Count reported
Low	<100
Low to moderate	100-500
Moderate	500-1,000
High	>1,000
Very heavy infestation	>10,000



Coccidial oocysts identified by microscopy

Sci-Tech provides analysis services to help with the detection of coccidiosis, so you can take measures to eliminate disease before it affects your flock's productivity. We also supply sampling kits and sample submission forms.

References

[Coccidiosis | The Advice Hub | The Chicken Vet](#)
<https://www.msdsmanual.com/poultry/coccidiosis/overview-of-coccidiosis-in-poultry>

The importance of high quality drinking water for livestock

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Water is essential for the survival of biological systems and will have a significant effect on animals. Many years ago, however, water quality was not considered to be important. Recent research worldwide has found that good quality, clean drinking water is a significant consideration when looking at animal welfare and productivity.

A supply of clean, fresh water facilitates metabolic processes, chemical reactions, temperature regulation, and waste elimination from the body. Water of poor quality or particularly high in salt content will lead to a reduction in water uptake by livestock, especially cattle. This could even lead to the livestock not drinking at all, which could be fatal.

To mitigate the issue of poor quality water, analysing the water supply is fundamental. Testing should contain the following parameters:

- TVC
- E. coli
- Coliforms
- Salmonella
- Manganese (Mn)
- Magnesium (Mg)
- Calcium (Ca)
- Copper (Cu)
- Sodium (Na)
- Iron (Fe)
- Hardness
- pH
- Nitrates and nitrites
- Total dissolved solids

It is very important to assess the layout of the premises that are being screened and to establish critical control points such as tanks and old pipework. It is particularly useful to identify dead ends in pipes, which can lead to stagnant water lingering inside for an extended period. If water is left in pipework, it is not uncommon to have an elevated level of bacteria and, in time, the presence of biofilms. Once present, these are very difficult to remove.

Once possible contamination areas have been identified, routine cleaning and sanitisation is required. Regular testing is also key to maintaining the quality of the water.

There are a number of legislative bodies which define the requirements for the quality of livestock waters, such as Red Tractor and AHDB. Each provide guidance on the overall requirements for each animal species, as there are significant differences. These legislative bodies also carry out farm audits, where the presentation of a certificate of water analysis is a key requirement.

Drinking water is used as a delivery route for vaccines into poultry, and contamination in the drinker lines reduces their efficacy. It is also important to check chlorine and heavy metal levels as this will also deactivate the vaccine, rendering the vaccination process ineffective.

A pig's water content is around 55% of their total body weight, and so a clean, fresh water supply is vital to facilitate metabolic processes and keep them fit and healthy. Water content can be up to 82% in a young pig, and porcine of all ages commonly drink 10% of their body weight every day. There have also been instances where contamination has led to an increased level of water consumption. This then leads to increased slurry production, resulting in additional costs to dispose of excessive animal waste.

To conclude, water quality is a key indicator of the health and production of livestock. As such, laboratory analysis of potable water is a must to help farmers and livestock producers assess its quality and help prevent disease with effective vaccine administration.

References

[Water quality: the winning formula for pig production | The Pig Site](#)

Read more on water quality and its effect on livestock in David's two-part blog:



[Part 1: birds](#)



[Part 2: pigs and cattle](#)

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