International Poultry Production

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Avian influenza XXVI

Live AI vaccines

Live vaccines offer the advantage of providing good protection against avian influenza and they can be applied by mass vaccination techniques such as spray vaccination or via the water. They tend to provide a more rapid protection than their killed counterparts.

Live unaltered LPAI vaccines are not recommended for use as poultry vaccines for seral reasons:

- They are quite capable of causing economical production losses via respiratory disease or egg drops.
- They can quite easily spread from bird to bird and from farm to farm potentially causing an endemic situation with the possible subsequent need to eradicate the vaccine virus.
- LPAI viruses have the potential to mutate or reassort to create more pathogenic viruses as has been seen, for example, with LPAI viruses becoming HPAI viruses in the field.

Currently no live vaccines are licensed for field use.

Genetically altered avian influenza vaccines

Various genetically altered avian influenza vaccines have been developed and investigated. These allow a regulated replication and creation of immunity without immunocompromising the birds or adversely affecting their performance.

This has involved the attenuation of influenza viruses by laboratory passage to generate cold adapted temperature phenotypes or by using biotechnology to directly alter the genome of the virus. This kind of vaccine has generally been used in mammals but a cold adapted H9N2 influenza virus, in which the H9 and N2 genes were replaced by H5 and N1 genes to produce a cold adapted H5N1 LPAI vaccine, protected birds against the H9N2 vaccine strain and H5N1 HPAI field virus challenge.

However, there is also a laboratory attenuated avian influenza virus that is not based on cold adaption. This avian influenza virus has a truncated NS1 of A/turkey/Oregon/1971(H7N3) LPAI virus which resulted in less replication in chickens and attenuation of virulence. However, this attenuation was not enough to enable in ovo vaccination as hatchability was adversely affected.

The development of infectious clones of influenza virus through reverse genetics technologies has created a system that permits directed mutations in one or more influenza gene segments that could result in sufficient attenuation to allow its usage as a live vaccine seed strain.