Commercial chicken vaccination: part 2 – drinking water administration

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Part one of this article **(*VT*46.16) reviewed equipment for spray vaccinating flocks of chickens and the factors affecting its success. This article assesses vaccination administered through drinking water, approximate timelines and the main factors affecting the viability of the vaccine.**

Figure 1. It is important to ensure dechlorinated water has reached the end of the drinker lines, meaning it is safe to administer the vaccine. This cross section of a nipple water line shows the dead space where both contaminated or chlorinated water can reside, indicating the need to flush lines, and where vaccinated water can sit without being accessible by the birds.

When it comes to mass vaccinating poultry flocks, one of the best approaches for minimising bird stress and handling is by administration through drinking water. This approach achieves good immune stimulation through the intestinal mucosa – assuming each bird obtains an equal dose through water consumption.

For this to happen, quality management of the vaccines and the water is essential to ensure the maximum proportion of the flock receives a dose, thereby minimising the effects of a field challenge through effective stimulation of the immune system.

Ensuring vaccine remains active

Ensuring equal vaccine distribution to the flock is futile if inactivation of live viruses is not prevented. To achieve a protective level of circulating and local antibodies, the virus must be alive when it reaches the host and, furthermore, must be of sufficient quantity to stimulate the target cells it binds to. Prevention of inactivation requires the vaccine to be protected against inactivating influences or to be administered rapidly.

Chlorine, sanitising products or heavy metals in the water will make the vaccine inactive (**Table 1**). Skimmed milk powder can be added to the water to eliminate chlorine and heavy metals; however, it is advisable to use a commercially available vaccine protection product, which neutralises chlorine and protects against heavy metals – while also dying the water blue.

At high concentrations the dye confirms the vaccine has been distributed to the birds and successfully administered by staining their oral cavity and tongue blue.

Simultaneous to water quality for vaccine success is equipment condition. Water lines contaminated with biofilms will reduce the efficacy of the vaccine and sediment can bind to it and inactivate it. Pipes and drinkers should be maintained in a clean state, chlorinated or treated for biofilm prior to vaccination and thoroughly cleaned as routine protocol at turnaround to remove chlorine contamination.

Water vaccine administration

Consider the number of birds requiring vaccination and the drinking system available. For small flocks drinking from bell or free-standing drinkers, it is worth mixing the vaccine in a reservoir tank and distributing it to drinkers with a watering can. For larger header tank systems, gravitational distribution, dose pumping or use of a proportioner are options for regulating the supply of

vaccinated water to the drinker system. Remember to check the expiry date, record the batch number and read through the manufacturer's recommendations.

Table 1. Factors affecting water vaccine activation	
Chlorine	Tasting or smelling chlorine means the concentration is too high. Chlorine will kill the live virus. Use a dechlorinating agent.
Heavy metals	Use plastic equipment to avoid excess levels of heavy metals. Determine your water hardness status.
UV light	UV light can inactivate the viral particles, so avoid direct sunlight.
Heat	Store as detailed on the vaccine label – usually refrigeration – avoid sunlight and administer into tepid water.
Organic matter	Ensure lines and drinkers are clean and free of organic matter or biofilms, which could bind and inactivate the vaccine virus.

Table 1. Factors affecting water vaccine activation.

Before administering the vaccine into the water system, producers should calculate the amount of water the birds will drink over a one-hour to two-hour period during which the vaccinated water will be delivered. It may be worth holding a trial run to ascertain the amount of water the birds consume over a set period of time. Other important points to remember prior to vaccination are:

- Withdraw water from the birds for one hour to two hours prior to vaccination so the birds develop a thirst that will drive them to drink when vaccinated water is available.
- Some producers offer a feed prior to lowering the water lines to ensure thirst has increased.
- Other producers will consider the time of day and changes to light intensity before water vaccinating.
- Drain the lines prior to flushing with vaccinated water as water in dead spaces may contain contaminants or chlorinated water (**Figure 1**).

When drinker lines are ready to receive vaccine-containing water, follow the manufacturer's guidelines along with the following tips:

- Vaccine preparation must occur in a clean environment and ensure work surfaces are clean or covered.
- Remove metal caps from vaccine vials and submerge the vial into 2L of distilled chlorine-free water, ensuring all powder has dissolved out of the vial and gently stir the solution.
- Add the solution to the remaining water calculated for the one-hour to two-hour period of drinking and continue to mix.
- Allow vaccinated water to reach the end of the line to allow even distribution and optimal exposure to drinking birds (**Figure 2**).

Monitor the birds closely during the vaccination period. Walk the flock and look for signs of water consumption or behaviour indicating the birds find the water unpalatable. Withdrawing water for too long a period of time (more than two hours) can cause birds to compete for drinker lines once lowered (**Figure 3**). This stressful event can lead to smothering or longer-term implications with production.

Only once all the vaccinated water has been consumed should the mains water be reintroduced. Vigilance at this period will allow a swift change over and avoid water deprivation once the header tank has been drained.

Table 2 is an example of a water vaccination timetable for use once ready to administer the vaccinated water.

Figure 2. Allow drinker lines to fill with vaccinated water before lowering them to let the birds drink. Using a dye in the water can indicate when vaccinated water in the header tank has reached the end of the line. 1L of water should be removed for every 3 metres of nipple drinker line.

Figure 3. Depriving birds of water to create thirst is commonly used when water vaccinating to ensure even uptake of the vaccine. Depriving birds for more than two hours can lead to aggression and smothering when water lines are lowered and, potentially, uneven uptake and coverage of vaccination.

Table 2. Water vaccination timetable	
Time	**Action**
0 minutes	Turn off water supply and allow birds to consume remaining water in drinker lines.
20 minutes	Remaining water should have been consumed. Raise the lines out of reach of birds.
80 minutes to 140 minutes	Water deprivation. Prepare vaccine. Monitor birds for signs of stress or excess thirst.
140 minutes to 160 minutes	Drain lines of unvaccinated water. Flush with untreated water. Administer vaccinated water. Prime the drinker line until vaccinated water has reached the end before lowering and allowing birds to drink.
160 minutes to 280 minutes	Birds should consume the predetermined volume of vaccinated water over one hour to two hours. Walk the birds and encourage movement towards drinkers. Monitor for signs of stress, smothering and continued water flow.
280 minutes to 300 minutes	End of vaccinating period. Turn on mains water. Clean equipment and continue to monitor birds.

Table 2. Water vaccination timetable.

Conclusion

Vaccinating through drinking water is an effective method of mass vaccination that, when efficiently managed, is quick, effective and poses minimal stress to the birds. The route of administration is effective at providing uniform immunity throughout the flock and the low stress levels allow birds to continue to perform and remain productive.

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- Commercial chicken vaccination: part 1 – spray and aerosol usage
- Commercial chicken vaccination: part 3 – injectable administration

Further Reading

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