

**Protocol for successful in-lay vaccination
with AviPro™ SALMONELLA DUO in
commercial laying hens**



1. Vaccination scheme ▶

2. Vaccine storage ▶

3. Considerations prior to administration ▶

- 3.1 Antibiotic residues ▶
- 3.2 Water sanitisation ▶
- 3.3 Organic and mineral deposits in the water system ▶
- 3.4 Water quality ▶
- 3.5 Environmental risks ▶
- 3.6 Compatibility with in-water de-wormers ▶
- 3.7 Compatibility with Exzolt® ▶
- 3.8 Vaccine preparation ▶
- 3.9 Positioning of the stock solution container ▶
- 3.10 Handling the vaccine ▶
- 3.11 Equipment ▶
- 3.12 Dosing pumps ▶

4. Equipment management ▶

5. Water stabiliser ▶

6. Water withdrawal ▶

7. Water volumes ▶

- 7.1 General guidelines on water requirements ▶
- 7.2 Simulated vaccination using a dosing pump. ▶

8. Application using a dosing pump ▶

9. Application through a header tank ▶

10. Procedure for successful vaccination ▶

- 10.1. Pre-application check ▶
- 10.2. House preparation ▶
- 10.3. Vaccine preparation ▶

11. Vaccine application using a dosing pump ▶

12. Vaccine application through a header tank ▶

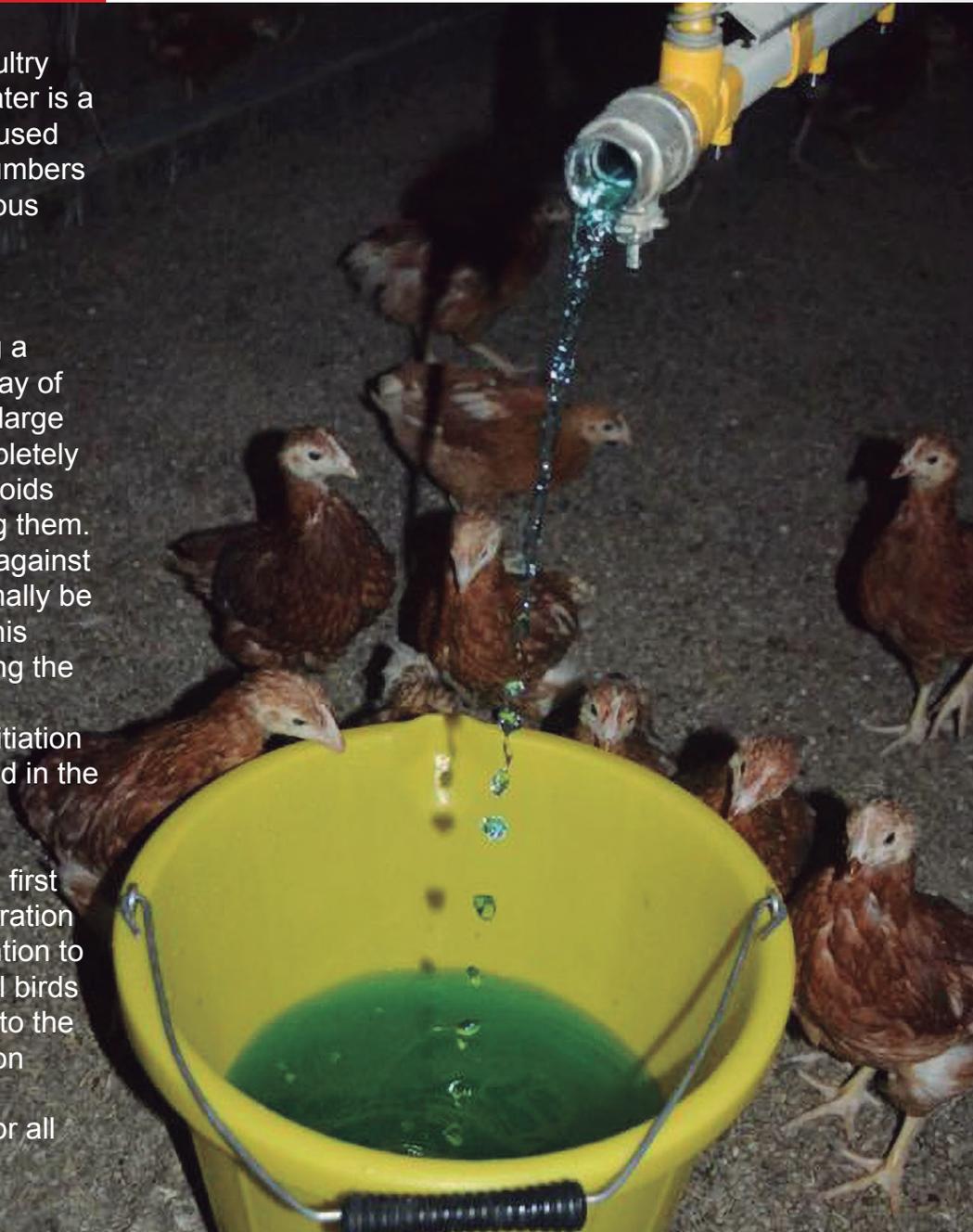


Overview

The administration of live poultry vaccines through drinking water is a long-established and widely used method to vaccinate large numbers of birds against major infectious pathogens.

This method has several advantages: as well as being a relatively quick and simple way of administering the vaccine to large numbers of poultry, it is completely stress-free to the bird and avoids the need of handling/injecting them. In addition, for live vaccines against pathogens which would normally be taken up via the oral route, this application method is mimicking the natural route of infection and therefore provides optimal initiation of the humoral system located in the gut.

Although straightforward at a first glance, this route of administration requires great care and attention to obtain satisfactory results. All birds must have adequate access to the drinkers during the vaccination period. The amount of water provided must be sufficient for all birds over the given period.



1. Vaccination

For successful vaccination and protection of hens in lay, three doses of AviPro™ Salmonella Duo must be administered in the rearing period followed by a fourth dose in-lay



Rearing Period



A single dose from the first day of life



A second dose at 6 to 8 weeks of age



A third dose around 16 weeks of age, at least 3 weeks before the onset of lay

In-Lay



A fourth dose around 50 weeks of age

2. Vaccine storage

Ensure that AviPro™ SALMONELLA DUO vaccine has arrived in good condition, using either a refrigerated service or validated packaging with ice packs. Upon arrival, transfer immediately to the designated vaccine refrigerator. This should be clean, in good working order and able to be locked. The temperature should be set to between 2 and 8 °C. Food and drink should not be stored in this fridge.

A min/max thermometer should be permanently positioned in the centre of the refrigerator to enable daily recording of the minimum and maximum temperatures. Please ensure that the temperature is in-range (between 2 and 8 °C) before unpacking the vaccine and transferring it to your refrigerator. The vaccine should be

positioned on the shelves away from the sides to prevent possible risk of the vials freezing.

Check that the correct product and the correct quantity have been delivered and there are no damaged or broken vials.

Record this incoming stock with batch numbers and expiry dates.



3. Considerations prior to administration

AviPro™ SALMONELLA DUO is a live freeze-dried vaccine containing two attenuated strains, *Salmonella* Enteritidis and *Salmonella* Typhimurium, that are reconstituted into the drinking water. Once in solution, the vaccine is stable for a number of hours, but several factors can impact the survival of the vaccine, or its ability to induce active immunity.

3.1 Antibiotic residues

Antibiotic treatments can compromise the viability of a live vaccine. If treatment is necessary, water lines should be thoroughly flushed prior to vaccination, and a seven-day withdrawal period should be observed before or after vaccine administration.

3.2 Water sanitisation

Substances used for sanitisation of drinking water, such as hydrogen peroxide, chlorine compounds (including chlorine dioxide treatment) and organic acids, should be removed for at least 24 hours before and after vaccination.

3.3 Organic and mineral deposits in the water system

A build-up of organic material within the nipple line creates the ideal environment and breeding ground for bacteria and fungi. These micro-organisms can often be found in mineral deposits or within biofilm, which also support their nourishment and protection. These deposits then act as a filter; once the vaccine is distributed down the drinker lines, the vaccine becomes caught on the biofilm or mineral deposits, dramatically reducing the dose reaching the bird. Therefore, clearing the water system of organic deposits is an important step before administering any vaccination via the drinking water.

3.4 Water quality

Good water quality is a fundamental requirement in producing healthy poultry, but for the purpose of vaccination, it is essential, as it is used as a transport medium for the vaccine. Alkaline water, along with water high in heavy metals such as iron, can reduce the viability of the vaccine. If the farm has its own water supply, the water quality should be checked regularly to ensure it is suitable for use. If you have any doubts about certain water parameters potentially affecting the stability of the vaccine, please get in touch with your Elanco technical representative.



3. Considerations prior to administration

3.5 Environmental risks

Disinfectants and sanitisers (developed to kill microorganisms such as bacteria and viruses) pose a significant risk to the survival of any live vaccine and care should be taken to ensure that they do not come into contact with the AviPro™ SALMONELLA DUO vaccine. Residues of disinfectants in the water lines can also negatively impact the survival properties of the vaccine. Therefore, if disinfectants have been used to treat the water lines, ensure they have been flushed out completely before applying the vaccine.

3.6 Compatibility with in-water de-wormers

Anthelmintic products have a detrimental effect on the live *Salmonella* vaccine strains when applied in the water at the same time. There are differences between individual dewormer products though, and in some cases, the addition of a water stabiliser can mitigate some of the effect. However, the use of a water stabiliser does not guarantee sufficient protection of the vaccine in all cases. Therefore, it is important that dewormers are not applied together with the *Salmonella* vaccine on the same day, even in the presence of a water stabiliser.

Some dewormers still have a significant negative effect on the vaccine strains at low concentrations (e.g. 1% of the recommended dose per bird); therefore, it is critical to ensure that no traces are left in the water line before vaccination is started.

It is therefore recommended vaccinating first and applying the dewormers a few days later. However, the veterinarian will have to decide on a suitable schedule.

3.7 Compatibility with in-water red mite treatment

Exzolt® has a detrimental effect on the viability of the *Salmonella* vaccine strains at higher water temperatures, and this effect can be mitigated to some extent through the addition of a water stabiliser. However, as the interaction between Exzolt® and vaccine viability cannot be predicted in individual cases, the vaccine should not be applied in drinking water on the same day as Exzolt®.

Traces of Exzolt® in the drinking water line may still exhibit a negative effect on the vaccine; therefore, we recommend vaccinating first and administering Exzolt® a few days later. However, the veterinarian will have to decide on a suitable schedule.



3. Considerations prior to administration

3.8 Vaccine preparation

Use a table or work surface that is clean and covered with a protective layer. Do not prepare the vaccine on the floor, as this area could be contaminated with disinfectants from foot dips. Avoid preparation near the sink, as this area will have been cleaned with soaps and sanitisers.

3.9 Positioning of the stock solution container

Use a dedicated stock solution container which is solely used for the preparation of vaccine stock and make sure this container is stored in a safe, clean place when not in use. Do not position the stock solution container near to foot dips, as risk of contamination is extremely high. Avoid positioning it next to water treatment equipment or chemicals. Ensure the stock solution container has a lid, to prevent contamination.



3.10 Handling the vaccine

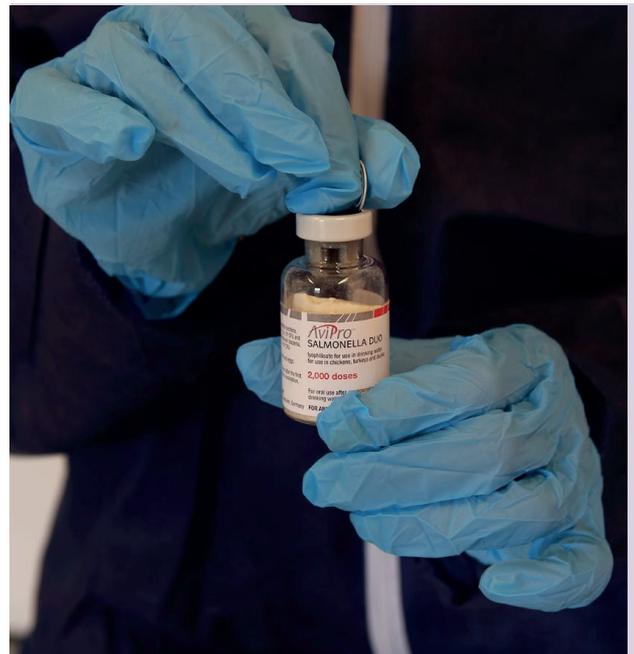
Always wear gloves to reduce the risk of contamination from soaps or sanitisers. Change gloves between the preparation of different houses. If you are concerned that you may have contaminated your gloves with disinfectant, change your gloves.

3.11 Equipment

Equipment should be thoroughly cleaned after use with cold water, followed by hot water (>70 °C), allowed to dry and stored in a clean, dust-free environment. Avoid stacking stock solution containers inside each other, to reduce the risk of contamination from the outer surface.

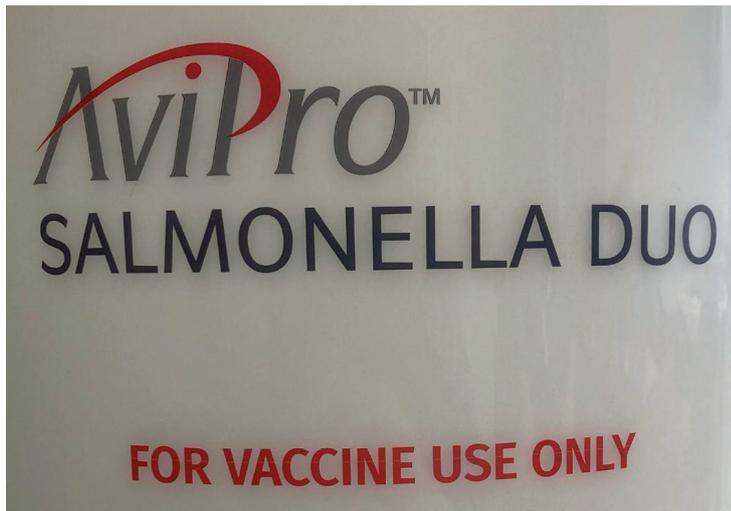
3.12 Dosing pumps

Always flush with clean fresh water to remove any residues from within the dosing chamber. Remove the suction tube and strainer, clean with cold water, followed by hot water (>70 °C), allow to dry and store in a clean, dust-free environment. Ideally, the use of a separate pump is recommended for the dosing of disinfectants and organic acids. If this is not possible, separate suction tubes and strainers should be used to prevent the risk of contamination.



4. Equipment management

All equipment used, such as stock solution containers, jugs, stirrers and suction tubes, should be clearly marked as vaccination equipment, ensuring that they are only used for vaccine administration. Once the vaccination has been completed, the equipment should be thoroughly rinsed in clean water, dried and then stored in a clean and secure location, preventing its use for antibiotic or disinfectant application.



5. Water stabiliser

A water stabiliser such as AviBlue™ should be used to protect the vaccine against harmful effects, such as deviations in pH, chlorine compounds and metal ions.

AviBlue™ offers instant protection in addition to a colouring agent, to aid the visualisation of the vaccine solution as it is distributed within the drinker system. Ensure that the manufacturer's recommendations are followed, as insufficient stabiliser may compromise the vaccination.

Add AviBlue™ to the drinking water at a concentration of one level capful (25 grams) to every 200 litres of water to be consumed.

It is important to ensure, when using a water proportioner, that the total amount of water to be consumed is calculated and the equivalent quantity of stabiliser is used.

For example, to treat 1,000 litres of drinking water at a dose rate of 1%, add 5 capfuls of AviBlue™ to the 10 litres of stock solution.

It is important to ensure, when using a water proportioner, that the total amount of water to be consumed is calculated and the equivalent quantity of stabiliser is used.



6. Water withdrawal

To ensure that all birds drink during the vaccination, a thirst period of up to 2–3 hours should be implemented prior to the administration of the vaccine. To achieve this in systems where you are unable to raise the nipple lines to prevent the birds drinking, the vaccination should be scheduled to start at the end of the dark period. The system will need to be primed in the dark, prior to lights-on. This will ensure that the vaccine is available as soon as the birds wake up and start drinking, replicating the natural daily routine and preventing any stress situations.



7. Water volumes

7.1 General guidelines on water requirements

Bird age and seasonality will influence the volume of water required. As a guide, hens at 50 weeks of age will drink 62 ml over a vaccination period of 3 hours.

7.2 Simulated vaccination using a dosing pump

The ideal and accurate method of calculating water requirements is to carry out a simulated vaccination one day prior to the planned vaccination. This simulated vaccination should be carried out at the same time of day as the planned vaccination, thus ensuring factors such as water withdrawal and feed periods are the same. It is also important to prime the lines during this procedure, so that the total water volumes are not miscalculated.

As an example, 16,000 hens would drink approximately 1000 litres over a 3-hour vaccination period, based on 62 ml per bird. Dosing at 1% they would require 10 litres of stock solution. For the simulated vaccination increase the volume by 50% to 15 litres which will more than cover what is required over the vaccination period.

Turn on the dosing system to prime the lines in the dark, (refer to point 6), Drain the clear water from each nipple line until the blue water is visible. Once all the lines are primed, this system is ready for the lights to be switched on.

The start time should be recorded. Three hours later, check to see how much stock solution has been consumed. This is the volume you will need to carry out the actual vaccination.



8. Application using a dosing pump

Most modern poultry houses are fitted with dosing pumps. There are two main types used.

I. Non-electric proportional dosing pump (Dosatron)

II. Electronic peristaltic pump (Select Doser)

Dosing pumps generally offer better control for administering vaccine, but it is important to select the right type of pump to suit the house set-up. The size and type of pump you should use will vary depending on the water volumes (m³/hour) and supply pressure. Peak demand is at the start of the day, when the lights switch on and the birds start drinking.

It is important to ensure that the dosing pump can handle this peak demand, preventing an underdose of vaccine.

When using a dosing pump, it is important that it is flushed with plenty of clean water, removing any residues from previous treatments. It is recommended that the doser is periodically dismantled and thoroughly cleaned.

A separate suction tube and strainer should be used when carrying out a drinking water vaccination. These should then be rinsed, allowed to dry, and kept with the other vaccination equipment.



9. Application through a header tank

Vaccination via the header tank is not so common today, due to the popularity of dosing systems. There are two types of systems used.

I. Gravity fed systems

II. Pressurised pump system

Before the introduction of dosing pumps, all water vaccine applications were applied using header tanks. These tanks are controlled by a ball valve, allowing them to fill to capacity and supply water via gravity to the nipple lines.

To be able to achieve desirable pressure, these tanks were situated in the roof space, normally within the poultry building. Often, no thought went into the design of these systems, with tanks normally difficult to access and with insufficient water holding capacity. Economics over the years leant towards larger bird numbers, resulting in longer houses and extra tiers. This can result in water deprivation around peak demand, creating a stress situation during vaccination.

The tank's capacity needs to be sufficient to hold enough water to complete a vaccination. It should be marked internally with litre measurements and have a drain system to enable its volume to be adjusted to the required volume for the vaccination.

Pressurised pump systems are normally used on larger systems with large floor tanks and a pressure pump. The advantage of these systems is that the water system is pressurised, preventing airlocks which are a concern in gravity-fed systems. This allows quick and effective priming, similar to a dosing system. It also allows better access to the tanks for administration and cleaning, whereas gravity tanks are rarely cleaned during the rearing period.

It is important, if using a header tank system, that the vaccine is thoroughly mixed within the tank before release. This needs to be done using a large plastic paddle or a recirculating pump, ensuring all corners are thoroughly mixed, otherwise it will lead to uneven distribution of the vaccine within the water system.



10. Procedure for successful vaccination in-lay

10.1 Pre-application check

10.1.1 Only vaccinate healthy birds. Any concerns should be discussed with your veterinary surgeon prior to administration, and the vaccination will need to be rescheduled if antibiotic treatment is required (refer to point 3.1).

10.1.2 Do not administer dewormers and live *Salmonella* vaccines on the same day (refer to point 3.6).

10.1.3 Do not administer Exzolt® and live *Salmonella* vaccines on the same day. (refer to point 3.7).

10.2 House preparation

10.2.1 Remove water sanitation products for at least 24 hours pre and post-vaccination (refer to point 3.3).

10.2.2 Ensure the house environment is normal, i.e. ventilation, feeders and water system are all functioning.

10.2.3 Do not vaccinate stressed birds.

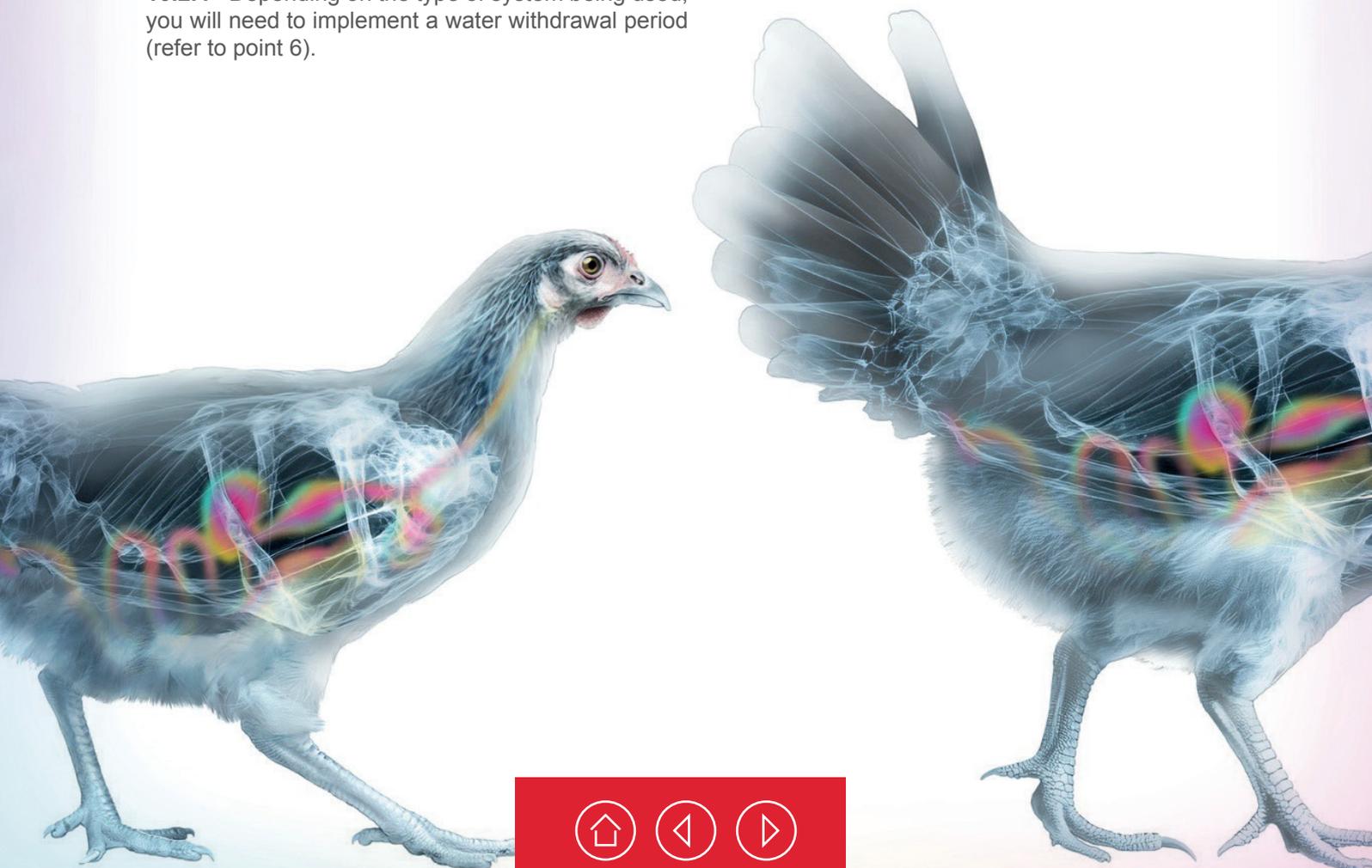
10.2.4 Depending on the type of system being used, you will need to implement a water withdrawal period (refer to point 6).

10.3 Vaccine preparation

10.3.1 Vaccines must be stored correctly, between 2 and 8 °C (refer to point 2).

10.3.2 When using the vaccine, only take out of the fridge the amount required for the house to be vaccinated. Make sure you carefully check the vial size and vaccine type. Use a cool bag with an ice pack when carrying the vaccine around the farm. This will also protect the vaccine from direct sunlight.

10.3.3 Calculate the volume of water to be used during the vaccination (refer to point 7). Ideally, a simulated vaccination should have been carried out as per point 7.2.



11. Vaccine application using a dosing pump

To ensure the dosing pump is working correctly, it is advisable to flush with clean water the day before you plan to vaccinate. This will ensure that any potential residues from previous treatments are removed from the pump and allows you to assess whether it is working correctly before you are committed to carrying out the vaccination.

11.1 If you are using a variable dosing pump, set the dosage rate to the required ratio or percentage.

11.2 Add the required volume of water to the stock solution container, but retain 3 litres in a jug for mixing the vaccine in before adding to the stock solution container.

11.3 Add AviBlue™ to the stock solution container at a concentration of one level capful (25 grams) for every 200 litres of water to be consumed (refer to point 5).

11.4 Thoroughly stir using a plastic or stainless-steel whisk.

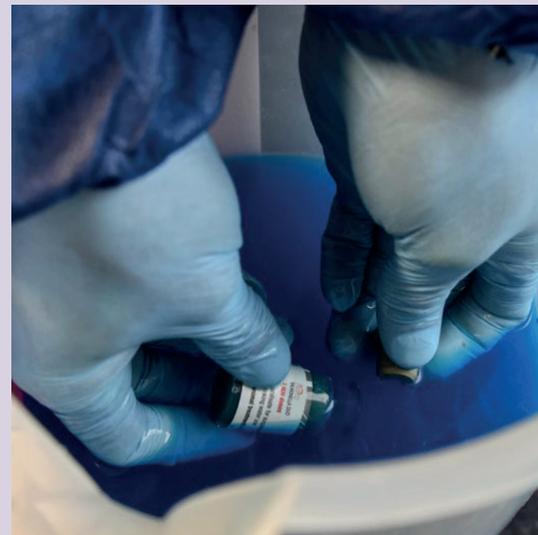
11.5 Add 2 grams of AviBlue™ to the 3 litres of water in the jug and thoroughly stir using a plastic or stainless-steel whisk.

11.6 Disposable gloves should be worn when handling vaccine (refer to point 3.5).

11.7 Remove the foil caps from each AviPro™ SALMONELLA DUO vaccine vial.

11.8 Open the vials by removing the rubber stopper under the stabilised water. Allow the vial to settle to the bottom of the jug, opening each vial in turn, as this allows the freeze-dried pellet to dissolve. Once all vials have been opened, rinse each vial individually into the jug, ensuring the contents have dissolved into stabilised water.

11.9 Mix thoroughly using the plastic or stainless-steel whisk.



11. Vaccine application using a dosing pump



11.10 Distribute the 3 litres of concentrated solution into the stock solution container. Mix thoroughly using the plastic or stainless-steel whisk.

11.11 Priming the system
Set the dosing pump to run. Ensure the bypass tap is closed off so all water has to pass through the dosing pump.

The system will need to be primed in the dark, removing all the clear water until the blue dye is present at the far end of the nipple lines. This normally requires two people and torches. This procedure is fundamental to ensure all clear water is removed from the line. Once ALL lines have been primed, the lights can be switched on to allow the vaccination to commence.

11.12 Record the start time of the vaccination.

11.13 Once the vaccine solution has been consumed, record the end time.

11.14 Flush the dosing pump with clean, fresh water.

11.15 Remove the suction tubes and strainers. Wash in clean water, along with the other equipment, allow to dry and store away to prevent accidental use for anything other than vaccination.

11.16 Switch the dosing pump off. Ensure the bypass tap is open, allowing the water to bypass the dosing pump, directly supplying the drinker system.

11.17 Check the nipple lines are working correctly, and water is available.

11.18 Review the length of the vaccination. Record and adjust water volumes if necessary for future vaccinations.

11.19 Record the vaccination in the medicines book, along with the number of doses used, batch numbers and expiry dates.



12. Vaccine application through a header tank

12.1 Ensure the tank is clean and there are no residues from previous treatments remaining in the tank.

12.2 Adjust the tank water level to achieve the required water volume.

12.3 Add AviBlue™ at a concentration of one level capful (25 grams) for every 200 litres of water to be consumed (refer to point 5).

12.4 Thoroughly mix using a plastic paddle, or if fitted, a recirculating pump.

12.5 Disposable gloves should be worn when handling vaccine (refer to point 3.5).

12.6 Add 3 litres of water to a 5-litre jug, along with 2 grams of AviBlue™. Thoroughly stir using a plastic or stainless-steel whisk.

12.7 Remove the foil caps from each AviPro™ SALMONELLA DUO vaccine vial.

12.8 Open the vials by removing the rubber stopper under the stabilised water.

Allow the vial to settle to the bottom of the jug, opening each vial in turn, as this allows the freeze-dried pellet to dissolve. Once all vials have been opened, rinse each vial individually into the jug, ensuring the contents have dissolved into the stabilised water.

12.9 Mix thoroughly using the plastic or stainless-steel whisk.

12.10 Distribute the 3 litres of concentrated solution across the surface of the tank. Mix thoroughly using the plastic paddle, ensuring that all areas within the tank have been mixed.

12.11 Priming the system

The system will need to be primed in the dark, removing all the clear water until the blue dye is present at the far end of the nipple lines. This normally requires two people and torches. This procedure is fundamental to ensure all clear water is removed from the line. Once ALL lines have been primed, the lights can be switched on to allow the vaccination to commence.

12.12 Record the start time of the vaccination.

12.13 Once the vaccine solution has been consumed, record the end time.

12.14 Rinse out the tank and refill with fresh water.

12.15 Check the nipple lines are working correctly, and water is available.

12.16 Ensure all equipment is washed in clean water, allowed to dry and stored away, preventing accidental use for anything other than vaccination.

12.17 Review the length of the vaccination. Record and adjust water volumes if necessary for future vaccinations.

12.18 Record the vaccination in the medicines book, along with the number of doses used, batch numbers



AviPro

SALMONELLA DUO

AviProTM SALMONELLA DUO: AviPro Salmonella Duo: Lyophilisate for use in drinking water. Statement of the active substance and other ingredients: One dose contains: Live attenuated Salmonella Enteritidis bacteria, strain Sm24/Rif12/Ssq, min. 1 x 10⁸ CFU* and max. 6 x 10⁸ CFU*. Live attenuated Salmonella Typhimurium bacteria, strain Na2/Rif9/Rtt, min. 1 x 10⁸ CFU* and max. 6 x 10⁸ CFU*. *CFU = Colony Forming Units.POM-V. Further information is available from the Summary of Product Characteristics. Use medicines responsibly www.noah.co.uk/responsible. Advice should be sought from the medicine prescriber prior to use.

Prescription decisions are for the person issuing the prescription alone. Elanco UK AH Limited, Form 2, Bartley Way, Bartley Wood Business Park, Hook RG27 9XA. Telephone: 01256 353131. Email: elancouk@elanco.co

AviPro, Elanco and the diagonal bar logo are trademarks of Elanco or its affiliates. ©2025 Elanco or its affiliates. PM-UK-26-0059

