

AviBlue[™]

AviPro[™]
SALMONELLA DUO

Protocol for successful vaccination
with *AviPro*[™] Salmonella Duo
in commercial pullet rearing



Elanco[™]

Contents

- 1. Vaccination scheme**
- 2. Vaccine storage**
- 3. Considerations prior to administration**
 - 3.1 Antibiotic residues
 - 3.2 Competitive exclusion products
 - 3.3 Water sanitisation
 - 3.4 Organic and mineral deposits in the water system
 - 3.5 Water quality
 - 3.6 Environmental risks
- 4. Equipment management**
- 5. Water stabiliser**
- 6. Water withdrawal**
- 7. Water volumes**
 - 7.1 First early vaccination
 - 7.2 Second and third later vaccinations
 - 7.3 Simulated vaccination
- 8. Application using a dosing pump**
- 9. Application through a header tank**
- 10. Procedure for successful vaccination of replacement pullets**
 - 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 the advantage of being a convenient way of achieving mass application of vaccine to poultry from the first day of life. Application via drinking water also mimics the natural route of infection.

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, and the amount of water provided must be sufficient for all birds over the given period.



1. Vaccination scheme

For successful vaccination of replacement layers, three doses should be given, as follows:



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



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 Competitive exclusion products

Competitive exclusion products are sometimes applied by spray in the hatchery or on farm, but the very nature of these products can competitively exclude the colonisation of the vaccine in the intestinal tract. Therefore, these products should not be applied to day-old chicks prior to the first vaccination.

3.3 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.

3.4 Organic and mineral deposits in the water system

A build-up of organic material within the drinker line creates an opportunistic environment for bacteria and fungi. These microorganisms 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 line, it can get 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 applying any vaccination via the drinking water.

3.5 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.

3.6 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.



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.

Positioning of the stock solution container

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.



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.

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.

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 2%, add 5 capfuls of AviBlue to the 20 litres of stock solution.

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 administration of the vaccine. To achieve this in cage rearing systems, the vaccination is scheduled after the dark period. On floor rearing systems, the nipple lines should be raised, preventing the birds' access to water.



7. Water volumes

7.1 First early vaccination

It is important to determine the required quantity of water needed to distribute the vaccine to the flock over a given period. The first vaccination is normally the most challenging to achieve. Ideally the vaccine should be administered in the first days of life, as recent work* has shown that early vaccination (at 1–3 days old) enables a better uptake, colonising the intestinal tract and stimulating active immunity. It enables the vaccine strains to enter the intestinal tract and colonise at the point where other microorganisms have not yet established.

The limiting factor on selecting which day to vaccinate is the capacity of the water system. In the first days of life, the system holds far more water than the chicks will drink during a normal 2–3-hour vaccination period. **Understanding the system's capacity is key to deciding when you can administer the first vaccination.** A guide to water pipe capacities is in the table below.

Table 7.1a General guidelines to water pipe capacities

Nipple line	Capacity per metre	Capacity per foot
22 mm square profile	330 ml	101 ml
28 mm square profile	560 ml	170 ml
MDPE blue water pipe		
22 mm	328 ml	100 ml
32 mm	528 ml	161 ml

When to vaccinate

To deduce the age at which your birds should be vaccinated with AviPro Salmonella Duo, you need to calculate the total capacity of the supply line and the capacity of the nipple lines to give you the total water holding capacity of the system.

Then, by understanding how much a chick is likely to drink in the first days of life (see Table 7.1b below), you can calculate the consumption over the vaccination period, and this will then help you calculate which day you are able to vaccinate.

Table 7.1b General guidelines on water requirements for birds

Age of birds	ml per bird per day
Day 1	5 ml
Day 2	8 ml
Day 3	9 ml
Day 4	10 ml
Day 5	11 ml
Day 6	14 ml
Day 7	16 ml

7.2 Second and third later vaccinations

The below table is a guide to the volume of water 1,000 birds at 6 and 16 weeks of age will drink over 2–3 hours.

Table 7.2a General guidelines on daily water intake for commercial chicks

	Age of birds	Litres per 1,000 birds
2nd Vaccination	6 weeks	42 litres
3rd Vaccination	16 weeks	60 litres

7.3 Simulated vaccination

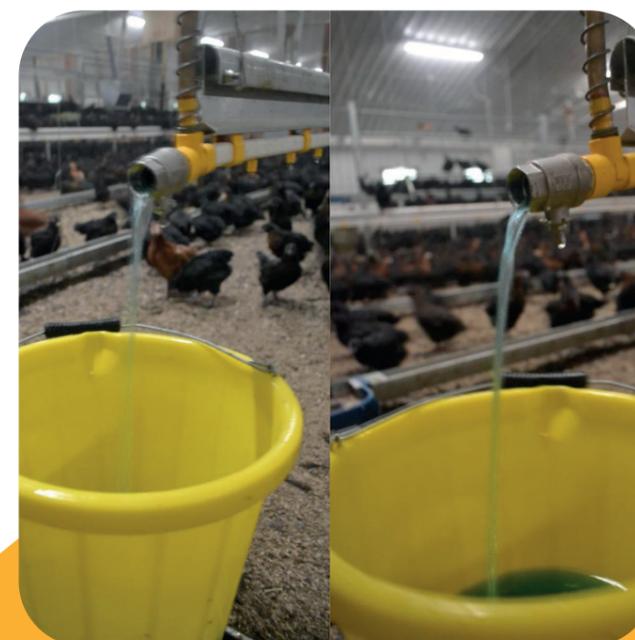
The ideal and accurate method of calculating water requirements is to carry out a simulated vaccination one day prior to the planned vaccination. This simulated vaccination should be carried out at the same time of day as the planned vaccination, thus ensuring factors such as water withdrawal and feed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

Tables 7.1b and 7.2a provide examples of water volumes required for the simulated vaccination. For example, 20,000 birds at 6 weeks would require 840 litres of water. If using a water proportioner at 2%, the required water would be 17 litres.

To ensure you have more water than required for the simulated vaccination, make up a stock solution of 30 litres, which is more than they will drink, based on the previous calculation. Add 7.5 capfuls of AviBlue and thoroughly mix.

If cage rearing, you will need to prime the lines in the dark, using this as the water withdrawal period. Towards the end of this water withdrawal period, the nipple lines should be primed, pushing out the clear water until the blue water is visible. Once all the lines are primed, the lights can be switched on.

In a floor rearing system, the lines are raised to withdraw water for 1–2 hours. Towards the end of the withdrawal period, the nipple lines should be primed, pushing out the clear water until the blue water is visible. The nipple lines can then be lowered to drinking height.



The start time should now be recorded. After 3 hours, check to see how much stock solution has been consumed. This is the volume you will need to carry out the actual vaccination. This figure can be used on each consecutive flock of the same flock size and age.

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 and supply pressure. In the early days of life, water volumes are low, and you need to ensure the pump can accurately dose at low flow rates, but also can handle high volumes towards the end of rear.

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.

The tank's capacity needs to be sufficient to hold enough water for the later vaccination at around 16 weeks of age. 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 of replacement pullets

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 Ensure no competitive exclusion products have been applied to the chicks in the hatchery (refer to point 3.2).

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 7.3.

11. Vaccine application using a dosing pump

Note: 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 3.6).

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 the stabilised water.



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

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.



Cage rearing – 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.

Floor rearing – With the lines raised, the system can be primed with the lights on to remove all surplus clear water into buckets at the far end of the nipple lines. This procedure is fundamental to ensure all clear water is removed from the line. Once ALL lines have been primed, they can be lowered to allow the vaccination to commence.

Note: It is important to wait until all lines within the house have been primed before they are lowered, as the demand on water will be high and it will result in an uneven uptake, with un-primed lines taking a long time to prime.

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.



Scan to view vaccine application videos.

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 (if the flock size and age of vaccination is the same).

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 3.6).

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

Cage rearing – 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.

Floor rearing – With the lines raised, the system can be primed with the lights on to remove all surplus clear water into buckets at the far end of the nipple lines. This procedure is fundamental to ensure all clear water is removed from the line. Once ALL lines have been primed, they can be lowered to allow the vaccination to commence.

Note: It is important to wait until all lines within the house have been primed before they are lowered, as the demand on water will be

high and it will result in an uneven uptake, with un-primed lines taking a long time to prime.

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 (if the flock size and age of vaccination is the same).





Scan for more
vaccination guidance



*Contact Elanco for further information.

AviPro Salmonella Duo contains: *Salmonella enterica*, subsp. *enterica*, serovar Enteritidis, strain Sm24/Rif12/Ssq, Live min. 1×10^8 CFU* and max. 6×10^8 CFU*. *Salmonella enterica*, subsp. *enterica*, serovar Typhimurium, strain Nal2/Rif9/Rtt, Live min. 1×10^8 CFU* and max. 6×10^8 CFU*. *CFU – colony forming units. Legal Category: POM-V. Advice should be sought from the medicine prescriber prior to use. Use medicines responsibly. www.noah.co.uk/responsible. Elanco UK AH Limited, Form 2, Bartley Way, Bartley Wood Business Park, Hook RG27 9XA. Telephone: 01256 353131. Email: elancouk@elanco.com. Prescription decisions are for the person issuing the prescription alone. For further information, consult the product SPC. AviPro, Elanco and the diagonal bar logo are trademarks of Elanco or its affiliates. © 2026 Elanco or its affiliates. PM-UK-23-0031. February 2026. 6997.015.