

Elanco™
A close-up photograph of a lion's face, split vertically. The left side of the lion's face and mane is illuminated with a red light, while the right side is illuminated with a yellow light. The lion's eyes are also colored to match the lighting: the left eye is yellow and the right eye is red.

SUCCESSFUL VACCINATION OF LAYER PULLETS DURING THE FIRST DAYS OF LIFE

POWERFUL *SALMONELLA* PROTECTION

**THE ONLY LIVE *DUAL-STRAIN* VACCINE
CONTAINING *S. ENTERITIDIS* & *S. TYPHIMURIUM***

AviPro™
SALMONELLA DUO

Providing **superior, direct protection**¹ against both regulated *Salmonella* strains in layers.²

RATIONALE OF THE TRIAL

- Chickens are most susceptible to an infection with *Salmonella* in the first 14 days of life
- Therefore, layer pullets should be vaccinated against *Salmonella* Enteritidis (SE) and *Salmonella* Typhimurium (ST) as early as possible to provide protection as soon as possible
- AviPro Salmonella Duo can be applied via the drinking water from the first day of life (compatibility of both strains is fundamental)
- However, some reluctance to carryout the vaccination in the first week due to concerns about water intake verses the water holding capacity of the system
- We wanted to show that successful vaccination is possible even when pullets are vaccinated as early as day 1 of life

EXPERIMENTAL SET UP

- Field trial – commercial layer pullets on farms (“real-life-scenario”)
- 4 vaccination time points – (day 1, 2, 3 or 5)
 - ▶ 4 farms
 - ▶ 3 houses on the same farm were vaccinated simultaneously in each trial
- Vaccination in drinking water with the addition of AviBlue™
- Vaccination had to be done over more than 3 hours due to the length of the water line and water consumption on the day

SAMPLES COLLECTED

- In each vaccination group, 30 birds (10 per house) were euthanized 2 days post vaccination
- 120 birds in total

Samples collected:

- Caecal content and liver 2 days post vaccination, from 10 individual birds per flock, chosen randomly
- Faeces: 2 pools of 10 faecal droppings collected 2 days post vaccination

UNDERSTANDING WATER VOLUMES



1. Water holding capacity of the system
 - ▶ Supply line (25mm 100ml/ft) (32mm 160ml/ft)
 - ▶ Nipple lines – square profile (22mm 100ml/ft) (28mm 170ml/ft)
2. Chick consumption in the first days of life (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

WATER INTAKE VERSUS THE WATER HOLDING CAPACITY

Example of a day 3 vaccination

Daily water requirement 9ml

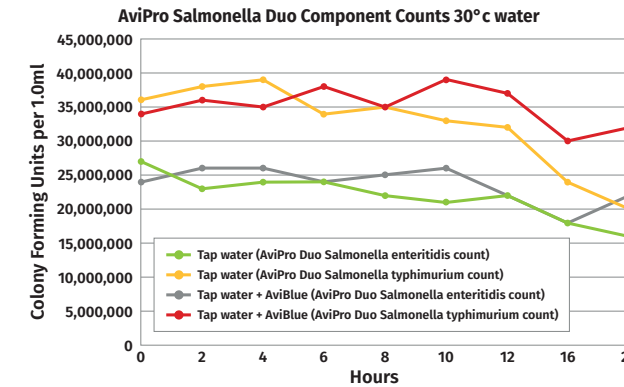
Vaccine requirement per farm	10,000	10,000	10,000
Total birds	10,400	10,400	10,400
Vaccination date (Day 3)	06/03/23	06/03/23	06/03/23
House	1	2	3
Bird numbers placed	10,400	10,400	10,400
Doses per house	10,000	10,000	10,000
System water holding capacity (L)	82	82	82
Daily estimate consumption (L)	94	94	94
Stock solution volume (L)	1.9	1.9	1.9
AviBlue capfuls	1/2	1/2	1/2

House 1	
3 nipple lines @ 190ft	
Dosatron	2%
Supply line 25mm	24.5
Nipple line capacity	19



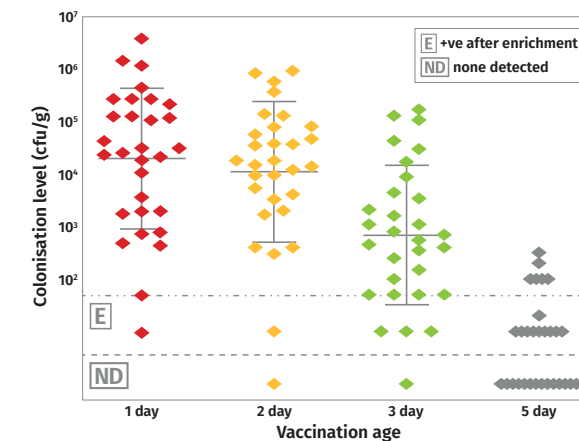
VACCINE STABILITY

After 24 hours the vaccine strains were still above the minimum batch release quantity for each strain.

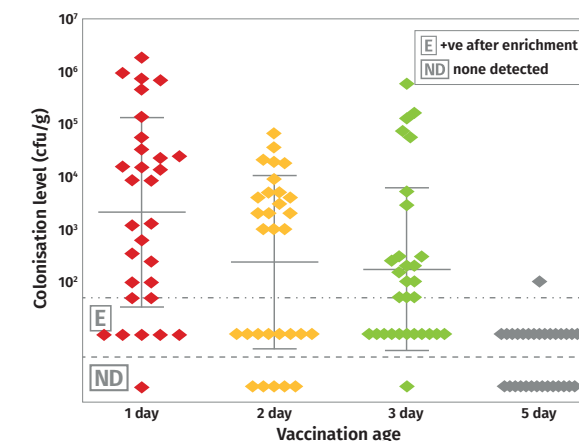


RESULTS: CAECAL SAMPLES

Caecal levels AviPro Salmonella Duo SE strain



Caecal levels AviPro Salmonella Duo ST strain



Results SE strain:

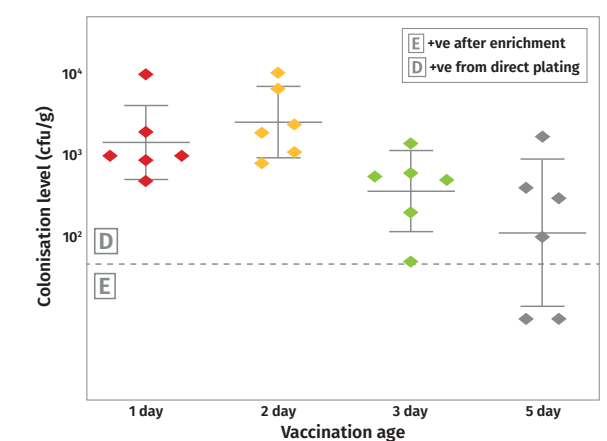
- Excellent colonisation of caeca was shown for birds vaccinated as early as day 1
- Levels of >10⁶ cfu/g caecal content in some birds
- Colonisation levels are significantly lower in birds vaccinated at day 5 compared to day 1, 2 & 3

Results ST strain:

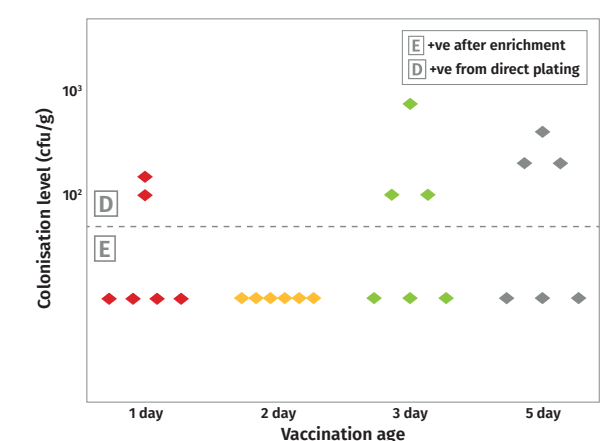
- Excellent colonisation of caeca was shown for birds vaccinated as early as day 1
- Levels of >10⁶ cfu/g caecal content in some birds
- Colonisation levels are significantly lower in birds vaccinated at day 5 compared to day 1 and 2

RESULTS: POOLED FAECAL SAMPLES

Faecal levels AviPro Salmonella Duo SE strain



Faecal levels AviPro Salmonella Duo ST strain

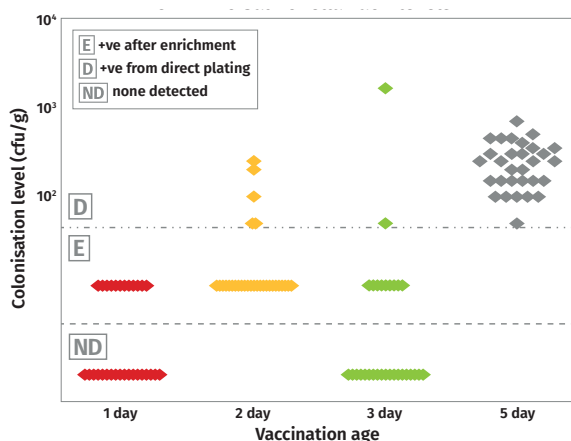




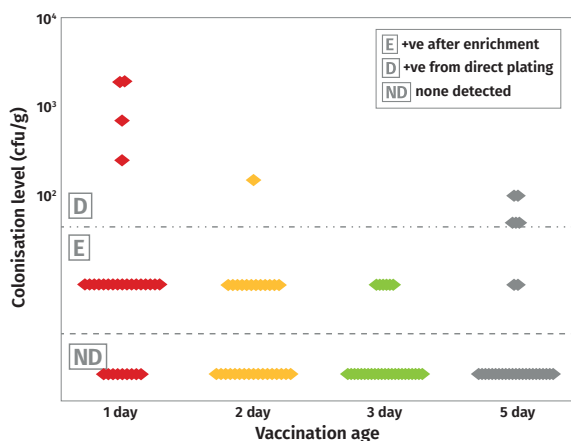
RESULTS: LIVER SAMPLES

Birds vaccinated at 5 days had higher SE vaccine levels in the liver compared to vaccinating earlier.

Liver levels AviPro Salmonella Duo SE strain



Liver levels AviPro Salmonella Duo ST strain



CONCLUSION

- All 120 birds were positive for the vaccine strains present in AviPro Salmonella Duo in at least one sample (caecal content or liver or both) two days post vaccination >>> **Every individual bird was successfully vaccinated**
- Levels as high as 10⁶ cfu/g of caecal content were reached in some birds even when vaccinated as early as day 1 or day 2
- Birds vaccinated earlier had higher vaccine counts in caecal contents*
- This result was expected as younger birds are known to be more susceptible to colonisation
- Birds vaccinated at day 5 had higher counts of the SE vaccine in the liver* (this result was unexpected and it is unclear if it has any relevance for the use in the field)
- All pooled faeces samples were positive for both vaccine strains in AviPro Salmonella Duo

DISCUSSION

- Results demonstrates that layer chicks can be vaccinated successfully as early as day 1, using AviPro Salmonella Duo
- Vaccination can take place over an extended period and is still successful, negating concerns regarding very young birds drinking insufficient quantities of administered vaccine solution (not administered at this point)
- The results show that the vaccine strains are stable in water over a long period of time

*2 days post vaccination. **References:** 1. Koerich, P. and Doblies, D. Comparison of the efficacy of a live bivalent Salmonella vaccine with a monovalent vaccine against a challenge with a *Salmonella* Typhimurium field strain. IPPE International Production & Processing EXPO, Atlanta (2023). 2. UK National Control Programme for *Salmonella* in Layers (*Gallus gallus*): 'Laying hens and flocks: poultry testing for salmonella' government guidance. <https://www.gov.uk/guidance/salmonella-get-your-egg-laying-hens-tested>.

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 Nal2/Rif9/Rtt, min. 1 x 10⁸ CFU* and max. 6 x 10⁸ CFU*. *CFU = Colony Forming Units. Indications: Chickens: For active immunisation of healthy and susceptible chickens to reduce faecal excretion and colonisation of internal organs with *S. Enteritidis* and *S. Typhimurium* field strains and to reduce colonisation of eggs with *Salmonella* Enteritidis field strains. Onset of immunity: 15 days. Duration of immunity: 52 weeks against virulent *S. Enteritidis* and 46 weeks against virulent *S. Typhimurium* from the time of the last vaccination when used according to the recommended vaccination schedule. Turkeys: For active immunisation of healthy and susceptible turkeys to reduce colonisation of internal organs with *Salmonella* Enteritidis and *Salmonella* Typhimurium field strains. In general, the colonisation of internal organs of vaccinated turkeys with challenge bacteria is reduced compared to unvaccinated turkeys. Onset of immunity: 21 days after first vaccination. Duration of immunity: for turkey breeders: 30 weeks against virulent *Salmonella* Enteritidis and 28 weeks against virulent *Salmonella* Typhimurium from the time of the last vaccination when used according to the recommended vaccination schedule. For turkeys for meat production: duration of immunity for 10 weeks against virulent *Salmonella* Enteritidis and against virulent *Salmonella* Typhimurium from the time of the last vaccination when used according to the recommended vaccination schedule. Ducks: For active immunisation of healthy and susceptible ducks to reduce the colonisation of internal organs with *Salmonella* Typhimurium field strains. Onset of immunity: 22 days. Duration of immunity: 43 days. Vaccination scheme: Chickens (layers and breeders): A single dose from first day of life followed by a second vaccination at an age of 6 to 8 weeks and a third vaccination around the 16th week of life at least 3 weeks before onset of lay. Turkey breeders: A single dose from the first day of life followed by a second vaccination at an age of 6 weeks, a third vaccination at an age of 16 weeks and a fourth vaccination at an age of 23-24 weeks. Turkeys for meat production: A single dose from the first day of life followed by a second vaccination at an age of 6 weeks. Ducks (for meat production): A single dose from first day of life. Administration: For oral use after resuspension in drinking water. **Contraindications:** none. **Adverse reactions:** None known. If you notice any serious effects or other effects not mentioned in this leaflet, please inform your veterinary surgeon. **Withdrawal period:** For chicken and ducks: meat, offal and eggs: 21 days. For turkeys: meat and offal: 70 days after the first vaccination, 49 days after repeated vaccination. **Special storage precautions:** Keep out of the reach and sight of children. Store and transport refrigerated (2 °C to 8 °C). Do not freeze. Protect from direct sunlight. Do not use after the expiry date stated on the label. Shelf-life after dilution or reconstitution according to directions: 4 hours. **To be supplied only on veterinary prescription:** **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.

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