

# Comparison of the efficacy of a live bivalent *Salmonella* vaccine with a monovalent vaccine against a challenge with a *Salmonella* Typhimurium field strain

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## Introduction and Objectives

*Salmonella* Typhimurium (ST) is one of the most important causes of human salmonellosis worldwide, and chickens can be asymptomatic carriers of infection, therefore posing a public health risk through the consumption of eggs and egg products or contaminated meat. Vaccination of future breeding and laying hens against ST is commonly used across Europe and in the rest of the world, with live vaccines offering numerous advantages compared to inactivated vaccines. In order to assess if a homologous vaccine against ST offers better protection for laying hens compared to a vaccine offering only heterologous protection, a trial was performed to assess the efficacy of two live *Salmonella* vaccines against a challenge with a ST field strain.

## Material and Methods

**Animals:** 105 day-old Lohmann Brown laying type chicks, randomly divided into three groups.

- **Group A:** 35 birds, vaccinated 3x during rear with a live bivalent (SE & ST) vaccine according to manufacturer's instructions (week 1, 6 & 16).
- **Group B:** 33 birds, vaccinated 3x during rear with a live monovalent (SE) vaccine according to manufacturer's instructions (week 1, 6 & 13).
- **Group C:** control group (37 birds, not vaccinated).

**Challenge:** Week 21: Animals in all three groups were challenged orally with  $8.3 \times 10^8$  cfu of a ST field strain.

**Samples collected:** in week 22, animals were euthanized and spleen and caeca collected.

**Analysis of samples for *S. Typhimurium* field strain:** *Salmonella* were isolated and enumerated on BGA plates. If no growth was seen, samples were pre-enriched in tetrathionate-brilliant green broth before plating out on BGA plates.

**Statistical analysis:** Kruskal-Wallis and Dunn's Multiple Comparison tests were used for statistical analysis.

## Main results and Discussion

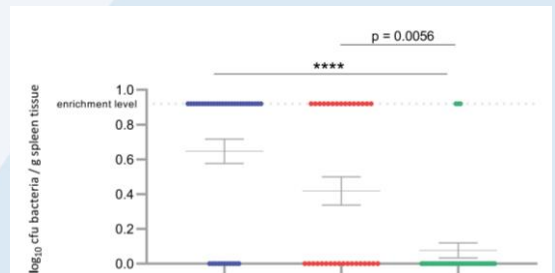
At 22 weeks of age and one week after the challenge with a *S. Typhimurium* field strain, the following results were obtained:

Recovery of ST challenge strain from caeca



**Caecal contents:** Birds vaccinated with the bivalent vaccine (green) had significantly lower counts of the ST field strain compared to birds vaccinated with the monovalent product (red) and compared with the unvaccinated control group (blue).

Recovery of ST challenge strain from spleen



**Spleen tissue:** Birds vaccinated with the bivalent vaccine (green) had significantly lower counts of the ST field strain compared to birds vaccinated with the monovalent product (red) and compared with the unvaccinated control group (blue).

## Conclusions

This trial clearly showed that birds vaccinated with the bivalent vaccine (green) showed significantly lower levels of the challenge strain in caecal contents and in spleen tissue compared to the monovalent vaccine group (red). Therefore, it could be demonstrated that the bivalent vaccine offered higher protection to avoid field strain colonization of internal organs. It can be assumed that the number of field strain organisms in caecal contents is directly related to the number of organisms shed in the faeces. We therefore expect that birds vaccinated with the bivalent vaccine show significantly lower shedding after infection with a ST field strain compared to birds vaccinated with the monovalent vaccine.