



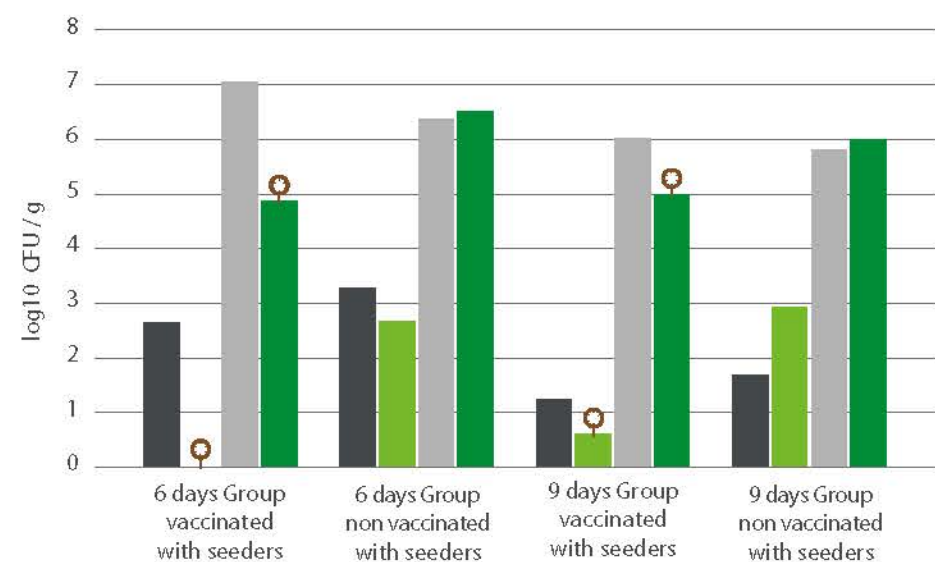
Cevac® Salmovac applied at day of age can induce a substantial reduction of *Salmonella* Enteritidis strain replication in the liver and in the caeca six days post-vaccination.

## EARLY-ONSET OF IMMUNITY: FROM 6 DAYS AFTER THE FIRST ADMINISTRATION

Study number H/F/011/97/A<sup>3</sup>.

SPF day old chicks were vaccinated on day 1 with Cevac® Salmovac, six days post-vaccination, seeder birds infected with a heterologous *Salmonella* Enteritidis strain were comingled with either vaccinated or control birds.

**S Enteritidis load in the caeca and the liver, 6 and 9 days after Seeder contact birds have been mixed with Cevac® Salmovac and non vaccinated birds**



- Seeder liver
- Contact liver
- Seeder caecum
- Contact caecum

\*Statistical significant difference between the vaccinated and the seeder & control groups (Mann Whitney U-test (one-tailed) 6 and 9 days post-vaccination, significance level  $p < 0.01$ ).



## DIFFERENTIATION BETWEEN THE VACCINE AND A FIELD ISOLATE

Cevac® Salmovac is an adenine and histidine auxotrophic vaccine strain. Therefore, you can distinguish the vaccine strain from field strains by using Ceva's dedicated growth media named S-Check.

You can use as well molecular PCR detection technic to differentiate vaccine strain from field strain.

STRAIN	MEDIUM A without Adenin & Histidine	MEDIUM B with Adenin & Histidine	APPEARANCE
Vaccine strain	No Growth	Growth	
Field strain	Growth	Growth	
Field strain (auxotrophic)	No Growth	No Growth	

## FEATURES AND BENEFITS



### EARLY ONSET OF IMMUNITY

Cevac® Salmovac can, thanks to the strain immunogenicity & fast replication, induce a fast onset of immunity 6 days after vaccination against a SE infection.



### BROAD PROTECTION

Cevac® Salmovac contains a unique live SE strain, which can reduce colonization of the intestinal tract and invasion and persistence of internal organs by *Salmonella* Enteritidis and *Salmonella* Typhimurium after 3 vaccinations. Cevac Salmovac SE strain can cover both SE & ST problems.



### LONG DURATION OF IMMUNITY

Cevac® Salmovac, after 3 vaccination, was able to demonstrate from the beginning of the laying period till the end a 63 weeks duration of immunity for SE and 60 weeks for ST.

1/ The European Union One Health 2018 Zoonoses Report, EFSA Journal 2019;17(12):5926.

2/ Springer S, Lindner T, Ahrens M et al. Duration of immunity induced in chickens by an attenuated live *Salmonella* Enteritidis vaccine and an inactivated *Salmonella* Enteritidis/Typhimurium vaccine. Berl Munch Tierarztl Wochenschr 2011; 124: 89-93.

3/ Springer S, Lindner T. Testing of the onset of immunity of a *Salmonella* Enteritidis live vaccine using a seeder bird model. IS5 2018.

#### Summary Product Characteristic

**Composition:** Cevac® Salmovac contains the double attenuated (adenine-histidine & auxotrophic) *Salmonella* Enteritidis strain in live, freeze-dried form.  
**Indication:** for the active immunisation of layer and broiler breeder pullets to reduce colonisation, persistence and invasion of the intestinal tract and internal organs by *Salmonella* Enteritidis and *Salmonella* Typhimurium. **Administration and dosage:** Cevac® Salmovac must be administered by drinking water route. Pullets should be vaccinated with one dose from first day of age, a second dose six weeks later and a third dose around 13 weeks of age.  
**Storage:** store vaccine between +2°C and +8°C. Protect from light.



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## ONSET OF IMMUNITY



## DURATION OF IMMUNITY



Salmonella Enteritidis



Salmonella Typhimurium

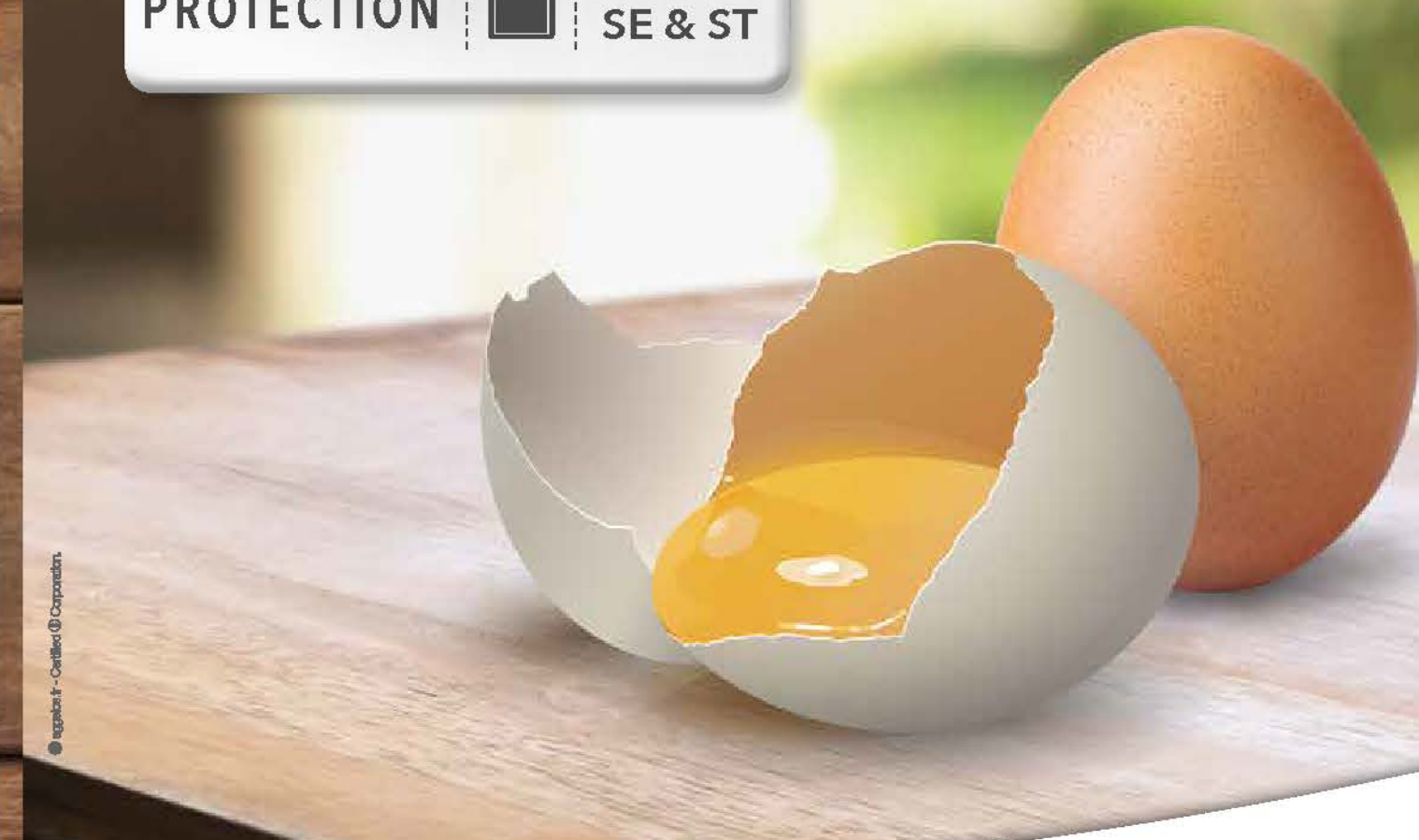
# CEVAC® SALMOVAC

## DOUBLE PROTECTION



1 strain covers SE & ST

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### Cevac® Salmovac

Reduce your risks of *Salmonella* Enteritidis and *Salmonella* Typhimurium from an early age and for the lifespan of your hens.



## SALMONELLA REMAINS A SIGNIFICANT ISSUE FOR FOOD SAFETY CONTROL ALL OVER THE WORLD

Salmonellosis is the second most common zoonotic disease after campylobacteriosis in the European Union<sup>1</sup>.

In the European Union, over 91,000 Salmonellosis cases are reported each year. European food safety agency has estimated that human Salmonellosis's overall economic burden could be as high as €3 billion a year.

Eggs & egg products are the primary sources of *Salmonella* foodborne outbreaks confirmed (45.6%).

The top 5 *Salmonella* serovars in human reported cases in 2018 in the EU are:

	Nb of cases	%
<i>Salmonella</i> Enteritidis (SE)	39 7981	49.9
<i>Salmonella</i> Typhimurium (ST)	10 395	13
<i>Salmonella</i> Typhimurium monophasic	6 427	8.1
<i>Salmonella</i> Infantis (SI)	1 859	2.3
<i>Salmonella</i> Newport	1 086	1.4



## VACCINATION: AN IMPORTANT TOOL TO CONTROL SALMONELLA

*Salmonella* vaccines can reduce organ colonization and shedding, which reduce possible vertical transmission to eggs and progeny.

However, they do not prevent the *Salmonella* to enter the house; that is why strict biosecurity measures with well-implemented hygiene procedures are essential to reduce the risk.

Live and killed *Salmonella* vaccines are available on the market.

## CEVA APPROACH FOR SE & ST CONTROL

Cevac® Salmovac contains a live attenuated *Salmonella* Enteritidis vaccine strain:

- It is a deleted strain that requires adenine & histidine for growth, allowing easy differentiation between vaccine & field strain without antibiotic gene resistance need,
- For Layers, layer breeders and broiler breeders,
- It needs 3 Applications: From week 1, 6 weeks later & around 13 weeks of age by drinking water,
- It is inducing active immunization of chickens to reduce colonization of the intestinal tract and invasion and persistence of internal organs by *Salmonella* Enteritidis and *Salmonella* Typhimurium,
- The onset of immunity is one week after 1<sup>st</sup> vaccination, and the duration of immunity is 63 weeks for SE and 60 weeks for ST after the third vaccine application.



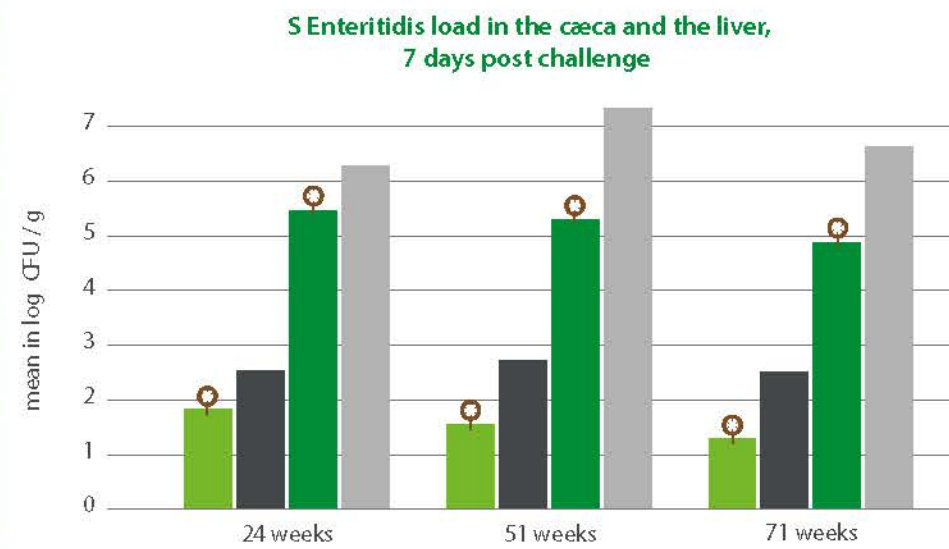
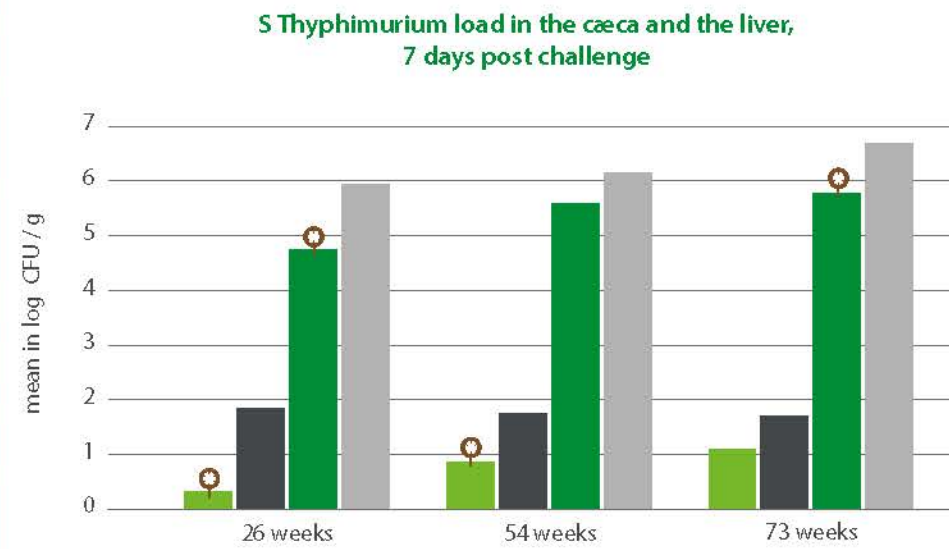
## ONE UNIQUE STRAIN DELIVERS BROAD & LONG-LASTING PROTECTION FOR SE & ST

Commercial brown pullets were vaccinated at weeks 1, 7 and 13 with Cevac® Salmovac by oral route<sup>2</sup> (registration dossier study FV/H/001A/07).

At three time points, vaccinated and control birds were challenged, with either *Salmonella* Enteritidis field isolate (147N, 5x10<sup>8</sup> cfu / dose) or *Salmonella* Typhimurium field isolate (27N, 1x10<sup>9</sup> cfu / dose) per oral gavage.

The latest SE challenge was run at 71 weeks of age, 58 weeks after the third application. For ST the latest challenge was run at 73 weeks of age, 60 weeks after the third application.

Cæca and liver were evaluated seven (7) days post-challenge for challenge strain load of vaccinate birds compared to none vaccinated hens.



● Cevac Salmovac Liver  
● Cevac Salmovac Cæca  
● Control Liver  
● Control Cæca

\*Significant difference between the vaccinated and control groups (Mann-Whitney U test, one-tailed test). Significance level  $p < 0.05$ .

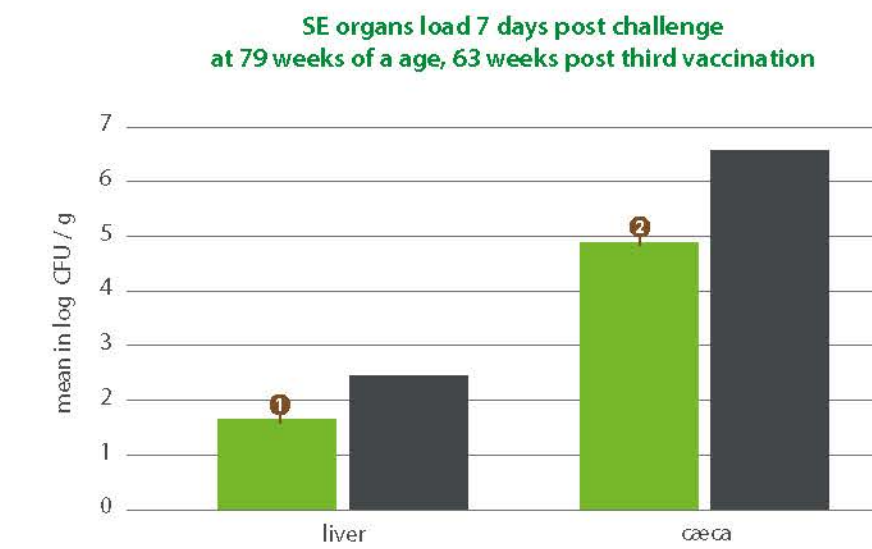


Cevac® Salmovac, after three (3) vaccine applications was able to demonstrate a significant reduction of the colonization of the caeca mucosa and invasion of the liver with *S* Enteritidis and *S* Typhimurium challenge strains from the beginning till the end of the laying period.

In a second trial, commercial brown pullets were vaccinated at weeks 1, 2<sup>nd</sup> and 16<sup>th</sup> of age with Cevac® Salmovac by the oral route (registration dossier study H/F/516/01/A).

At 79 weeks of age, 63 weeks after the 3<sup>rd</sup> vaccination, vaccinated and control birds were challenged, with *Salmonella* Enteritidis field isolate (147N, 5x10<sup>8</sup> cfu / dose) per oral gavage.

Cæca and liver were evaluated seven (7) days post-challenge for challenge strain load of vaccinate birds compared to none vaccinated hens.



● Cevac Salmovac  
● Control

\*A significant difference between the vaccinated group and control group (Mann-Whitney-U-Test, on tailed).  
1/ Significance level  $p=0,019$ .  
2/ Significance level  $p=0,001$ .



The duration of immunity was demonstrated up to 63 weeks for SE & 60 weeks for ST after the 3<sup>rd</sup> vaccine application during rearing.