

Bulletin

Boehringer Ingelheim Vetmedica, Inc.

TECHNICAL

Simultaneous use of Boehringer Ingelheim Vetmedica, Inc. Oral Attenuated Swine Vaccines

Three studies were conducted to determine if Enterisol[®] Ileitis (*Lawsonia intracellularis*), (referred to as EI FF for frozen form and EI NF for non-frozen form), Enterisol[®] SC-54 (*Salmonella choleraesuis*), (referred to as SC54), and Ingelvac[®] ERY-ALC (*Erysipelothrix rhusiopathiae*), (referred to as Ery) vaccines could successfully immunize 3-week old weaned pigs when administered simultaneously (Table 1). All vaccines were Frozen Form (with the exception of *Non-Frozen* Enterisol Ileitis in Trial I-Group 2) and were administered by oral drench. The *Lawsonia* and *Erysipelothrix* challenge organisms were derived from different parent isolates than the respective vaccines. Appropriate primary protective effects were measured as previously established for each disease model.

Table 1. Experimental designs for assessing interference between 3 oral attenuated vaccines.

Challenge organism challenge route	Treatment groups	N	Vacc ~Age	Chall ~Age	Necropsy ~Age
Study 1	1. EI-FF/SC54/Ery	20	3 wks	6 wks	9 wks
<i>L. intracellularis</i>	2. EI-NF/SC54/Ery	20	3 wks	6 wks	9 wks
Isolate N101494	3. Challenge Controls	20	--	6 wks	9 wks
Oral drench	4. Strict Controls	10	--	--	9 wks
Study 2	1. SC54/EI/Ery	15	3 wks	7 wks	9 wks
<i>S. choleraesuis</i>	2. SC54	15	3 wks	7 wks	9 wks
Strain 38	3. Challenge Controls	15	--	7 wks	9 wks
Intranasal	4. Strict Controls	5	--	--	9 wks
Study 3	1. Ery/EI/SC54	15	3 wks	6 wks	7 wks
<i>E. rhusiopathiae</i>	2. Ery	15	3 wks	6 wks	7 wks
Strain E-1-6	3. Challenge Controls	15	--	6 wks	7 wks
Intramuscular injection	4. Strict Controls	5	--	--	7 wks

Results: Vaccines administered simultaneously showed significant protective effects for their respective diseases (Table 2, Figures 1-3).

Table 2. Significant protective effects found with the target vaccine in three separate studies.

Vaccine	Disease/agent	Protective effects ($p \leq 0.05$)
Enterisol Ileitis FF & NF	Ileitis/proliferative enteropathy <i>Lawsonia intracellularis</i>	Gross lesion prevalence and severity
Enterisol SC-54	Salmonellosis <i>Salmonella choleraesuis</i>	Fever, organ culture, fecal shedding, clinical signs
Ingelvac Ery-ALC	Erysipelas <i>Erysipelothrix rhusiopathiae</i>	Mortality, clinical signs

Summary

1. No interference with immunization was observed when the vaccines were administered simultaneously.
2. Simultaneous use of vaccines had no negative effect on pre-challenge weight gain.
3. Enterisol Ileitis FF and NF provided bioequivalent protection against challenge with *Lawsonia intracellularis*.

Figure 1. Gross lesion scores in pigs vaccinated or not vaccinated with Frozen or Non-Frozen Enterisol Ileitis administered simultaneously with Enterisol SC-54 and Ingelvac ERY-ALC

*Lesions in strict control pigs were IHC-negative for *Lawsonia intracellularis*.

Strict controls are not included in the statistical analysis. P<0.05

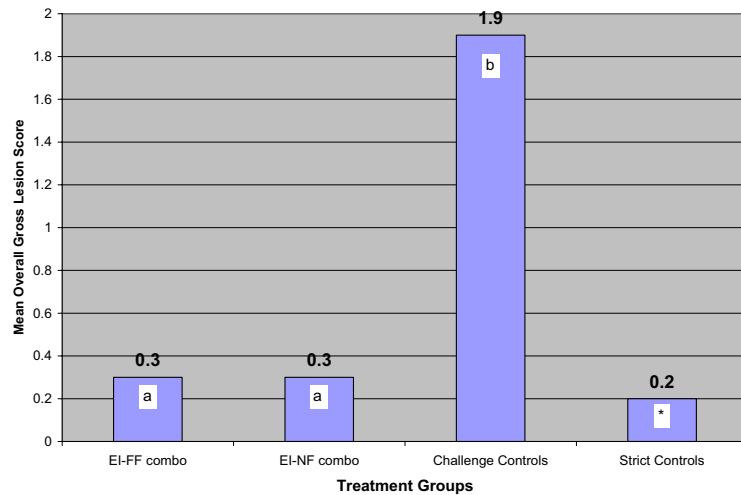


Figure 2. Salmonella colonization of mesenteric lymph nodes and colons in vaccinated and non-vaccinated pigs

Strict controls are not included in the statistical analysis. P<0.05

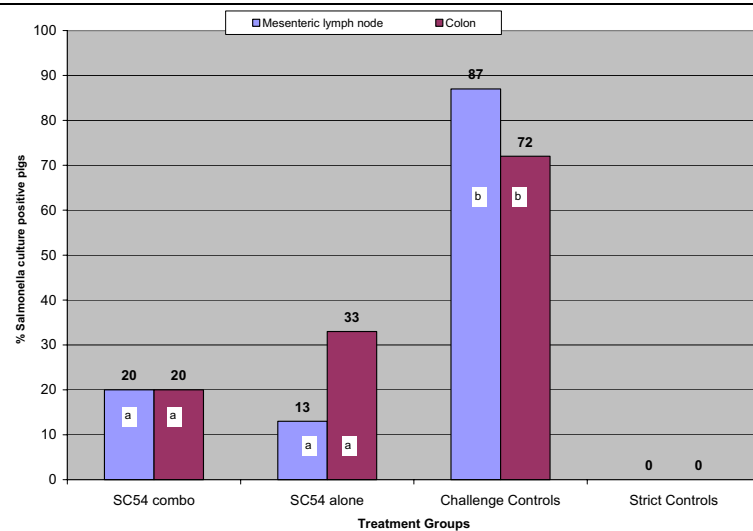
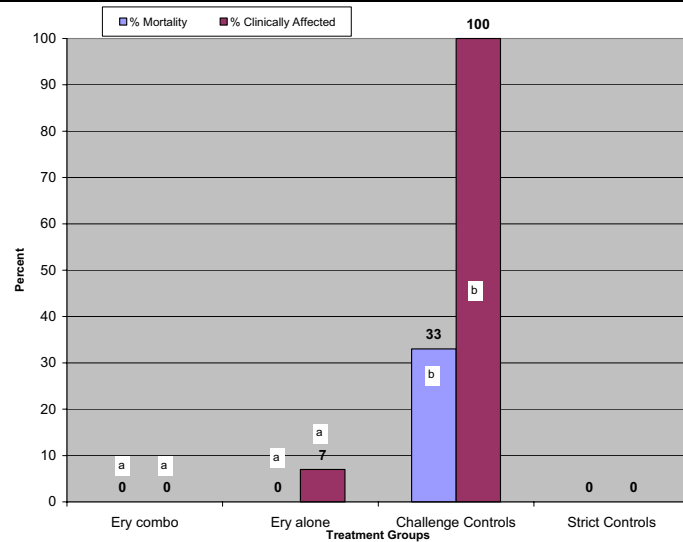


Figure 3. Erysipelas mortality and clinical signs in vaccinated and non-vaccinated pigs

An erysipelas challenge is considered valid by the USDA when >80% of challenge control pigs are clinically affected for at least 2 consecutive days. Erysipelas immunity is considered protective if >90% of vaccinated animals are not clinically affected.

Strict controls are not included in the statistical analysis. P<0.05



Even though these products[‡] are now approved for simultaneous administration it may not always be advisable to do so. Optimal vaccination timing for each individual disease may differ depending upon when maternal immunity depletes and onset of infection occurs for the specific pathogens. Herd histories and diagnostic assessments can help determine appropriate timing for each vaccine.

[‡]Enterisol Ileitis FF, Enterisol SC-54 FF, and Ingelvac ERY-ALC are approved for simultaneous administration.