A Comparison of Different Adjuvants in *Streptococcus suis* Autogenous Vaccines

Bimeda® Biologicals

TECHNICAL BULLETIN

SWINE

INTRODUCTION:

Streptococcus suis (S. suis) causes significant losses across the swine industry as a primary source of bacterial infection. Infection, mainly in nursing and recently weaned piglets, leads to septicemia, arthritis, and meningitis. There are currently 29 *S. suis* serotypes (ST) which have differential prevalence based on region with serotypes 1,1/2,2,3,5,7 and 14 being the most prevalent pathogenic strains in the United States[1]. The genetic and geographic diversity as well as the near ubiquity of non-pathogenic strains present in pig farms make *S. suis* a particularly challenging target for prophylactic therapies. Subsequently, autogenous vaccines have been widely relied upon to help reduce the severity of infection on operations across the United States. In this study, several autogenous *S. suis* bacterins formulated with different adjuvants were compared in a *S. suis* ST1 challenge study.

OBJECTIVE:

Determine the efficacy of *S. suis* bacterins formulated with different adjuvants against a lethal *S. suis* ST1 challenge.

METHODS:

Piglets, Randomization, and Maintenance

Piglets were received soon after weaning (18-21 days of age) and were randomized by litter into five Treatment Groups containing 10 piglets each. On the initial day of the trial, nasal swabs were collected randomly from each group to be sent to Iowa State University Veterinary Diagnostic Lab (ISU VDL) for isolation and identification of *S. suis* for background observation. Water and appropriate feed rations were provided ad libitum throughout the study. The barn and all pigs were monitored daily to maintain conditions and monitor health.

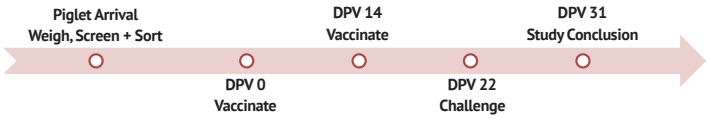
Vaccine Formulations

Four of the five Treatment Groups received autogenous vaccine formulations containing *S. suis* ST1 antigen and a different adjuvant. Adjuvant was included according to manufacturer recommendations. The fifth Treatment Group was the control and piglets in this group were given a saline-pbs placebo.

Treatment	# of Doses	Antigen	Adjuvant Manuf.	Adjuvant Type
A	2	*S. Suis* ST1	Company I	Water-In-Oil
B	2	*S. Suis* ST1	Company S	Oil-In-Water
C	2	*S. Suis* ST1	Bimeda	Oil-In-Water
D	2	*S. Suis* ST1	Company T	Oil-In-Water
E	2	Saline-PBS	N/A	N/A

Vaccine Administration, Challenge and Monitoring

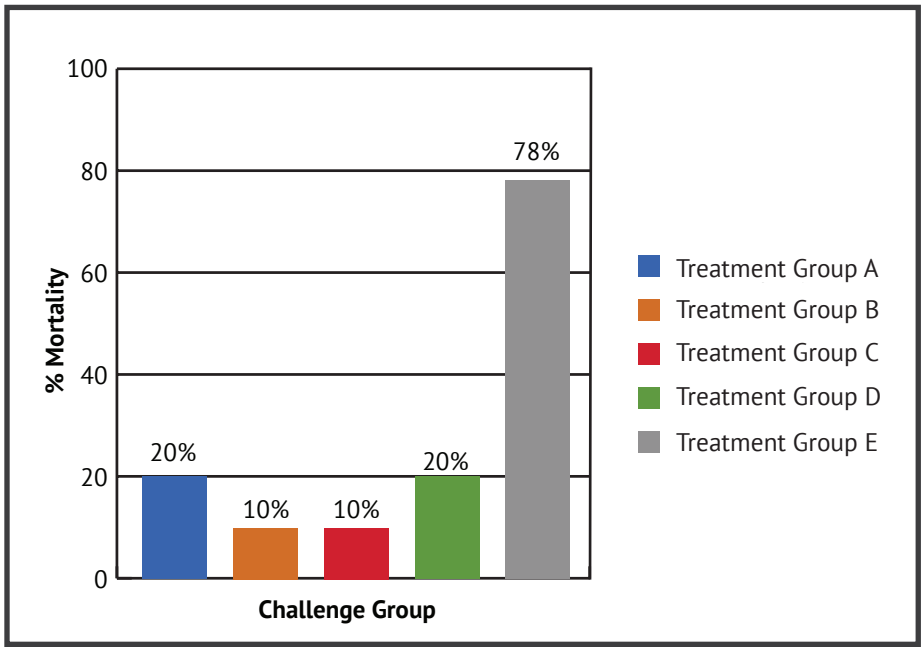
Three days after arrival and randomization (DPV 0), all Treatment Groups were vaccinated with 2cc intramuscularly in the side of the neck per label instructions. Fourteen days later (DPV 14), all Treatment Groups they received a second 2cc booster dose. Seven days later (DPV 22), all piglets were challenged using a pathogenic field strain of *S. suis* ST1 that was administered through intramuscular (2cc) and intraperitoneal (2cc) injection. For nine days post challenge (DPC) (DPV 22 - DPV 31), piglets were monitored and scored for clinical signs of *S. suis* infection.



RESULTS:

Initial screening for *S. suis* showed high colonization with positive swabs from 8 of the 10 screened piglets (non-pathogenic serotypes 21 and 28). One piglet in the control group died prior to challenge from symptoms unrelated to the study. Piglets in Treatment Group A exhibited swelling at the injection site. No piglets from the other Treatment Groups exhibited any ill response to vaccination. The *S. suis* ST1 challenge was successful with 78% of the control group being found dead or euthanized and 100% morbidity starting at 3 DPC. All vaccinated Treatment Groups exhibited significantly lower mortality as compared to the control group. Treatment Groups B and C (Stabligen B, Bimeda Biologicals) had the lowest mortality, with only one pig being euthanized from each group.

FIGURE 1: MORTALITY



CONCLUSIONS:

In this study, all vaccine formulations were effective in significantly lowering mortality rates following the *S. suis* ST1 challenge as compared to the control group. Piglets in Treatment Group A exhibited minor vaccination site reactions. No adverse effects were observed in Treatment Groups B, C and D, all of which included oil-in-water adjuvants.This study demonstrates that Bimeda Biologicals' Stabligen B adjuvant can be used in *S. suis* autogenous vaccines and perform as well as competitive alternatives.

REFERENCES:

[1] Goyette-Desjardins, G.; Auger, J.P.; Xu, J.; Segura, M.; Gottschalk, M. Streptococcus suis, an important pig pathogen and emerging zoonotic agent-an update on the worldwide distribution based on serotyping and sequence typing. Emerg. Microbes Infect. 2014, 3, e45

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