NEUTRALIZATION OF *Clostridium perfringens* TOXINS BY SERA AND WHEY FROM IMMUNIZED SOWS WITH SUISENG®

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INTRODUCTION

Clostridial infections in swine have been recognised for many years as a complex and fatal disease, because the infections progress rapidly and the effect of their toxins. Vaccination has become an important control measure in domestic animals.

SUISENG® is a polivalent vaccine which has one indication for the prevention of piglet neonatal diarrhoea due *Clostridium perfringens* (*C. perf.*) by means of colostrum passive immunity. The objective of this study was to assess the serological response against the toxins of *C. perf.* toxins. For this purpose, we used ELISA to obtain the IgG seroprofile and the the seroneutralization (SN) properties against the β-toxin of *C. perf.* to assess biological significance of the antibodies.

MATERIALS AND METHODS

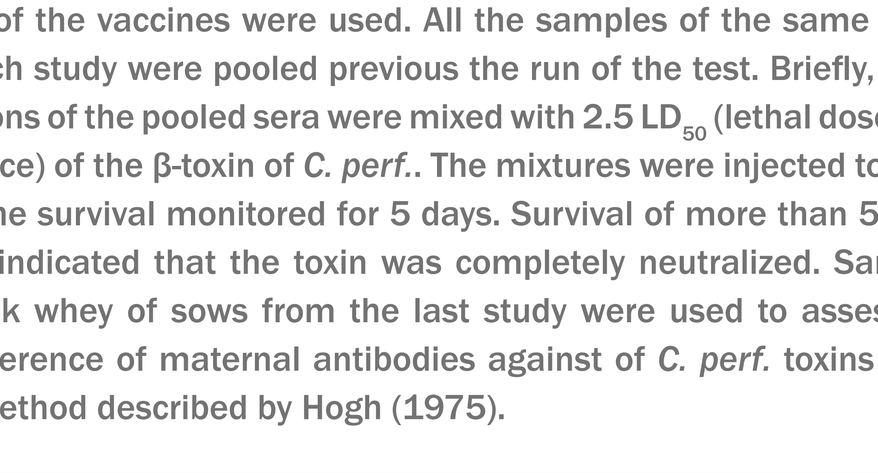
Sera from 4 independent studies of sows vaccinated with SUISENG® and with a Placebo were used for this work. The immunization program was two doses of the vaccine/placebo administered 3 weeks apart during the gestation. The samples of one of the studies were used for the IgG assessment using the ELISA. The animals were sampled the day 0 (first dose SUISENG®), 3 weeks later (second dose SUISENG®) and approximately 3 weeks afterwards. The results for each sample of this assay were normalized using a positive control and a negative control included in each plate.

For the SN assay, the sera samples obtained 3-4 weeks after the second dose of the vaccines were used. All the samples of the same group of each study were pooled previous the run of the test. Briefly, serial dilutions of the pooled sera were mixed with 2.5 LD_{50} (lethal dose 50% for mice) of the β-toxin of *C. perf.*. The mixtures were injected to mice and the survival monitored for 5 days. Survival of more than 50% of mice indicated that the toxin was completely neutralized. Samples of milk whey of sows from the last study were used to assess the transference of maternal antibodies against of *C. perf.* toxins using the method described by Hogh (1975).

RESULTS

The mean of normalized results (IRPC) of the ELISA are represented in the next figure. Each point is the mean on 5 animals included in each study group.

Figure 1. Serological response assessed with the ELISA.



The results of the SN assay for the sow sera samples are summarized in the next table.

Table 1. SN assay of the pooled sera of each study.

Group	Pool from Study (N)	Toxin Seroneutralization
Vaccinated	1 (5)	Yes
	2 (5)	
	3 (10)	
	4 (5)	
Placebo	1 (5)	No
	2 (5)	
	3 (10)	
	4 (5)	

The SN results of whey are expressed as International Units (IU) following the methodology described by Hogh (1975).

Table 2. SN assay of colostrum samples.

Group	Sow	Titre (UI/ml)
Vaccinated	1	ns[a]
	2	5-10
	3	>10
	4	ns
	5	>10
Placebo	6	-[b]
	7	-
	8	-
	9	-
	10	ns

a: no sample available; b: titre < 5 UI/ml

DISCUSSION

These results demonstrate that the vaccination with SUISENG® generates SN antibody titres against *C. perf.* toxins. It is also demonstrated that these antibodies are transferred to the colostrum/milk. Ripley (1983) stated that sow colostrum β-antitoxin titres equal or higher than 5 UI/ml reduce markedly the specific mortality due Necrotic Enteritis in the litters. Hogh (1976) quantified the protection in epizootics *C. perfringens* infection in neonatal piglets. They saw that ≥5 UI/ of β-antitoxin per ml of colostral whey provide 75% of protection for mortality.

With all the above in mind, it can stated that the SUISENG® induce an evident serological response in the vaccinated sows. These antibodies are transferred to the colostrum/milk and to the piglets. The results of this work demonstrate that these antibodies are seroneutralizing for the β-toxin of the *C. perf.* and that the antibody titres obtained are in accordance with the results of other authors. Finally, the bibliographical data demonstrate that the level titres obtained with SUISENG® are protective against the specific mortality of the *C. perf.* Type C infection in piglets (Necrotizing Enteritis).

BIBLIOGRAPHY

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