Safety and Efficacy of a live attenuated *Erysipelothrix rhusiopathiae* vaccine for swine

Philip R. Lehrbach\(^1\), Yong Ming\(^1\)

*Pfizer Animal Health*

Philip.Lehrbach@pfizer.com

**Introduction**

Infection with *Erysipelothrix rhusiopathiae* has a significant economic impact on pig production systems worldwide (1). Traditionally inactivated vaccines have been used to control the development of clinical signs of swine erysipelas. The development of a live attenuated erysipelas vaccine offers the potential to administer a mass applied vaccine, without the possibility of adverse reactions often associated with injectable vaccines and the benefits of cost savings following mass application techniques.

In this study we evaluated the safety of a live attenuated erysipelas vaccine by assessing the “absence of reversion to or increase in virulence” of the vaccine strain in pigs (2). Efficacy was assessed following administration of the vaccine to pigs through the drinking water and subsequent virulent challenge.

**Materials and Methods**

The pigs for the safety study were sourced from a commercial farm (Palmerston North, New Zealand). Pigs were inoculated with the *Erysipelothrix rhusiopathiae* vaccine strain according to guidelines provided by VICH for examination of live vaccines in target animals for absence of reversion to virulence (3).

For the efficacy study crossbred swine were sourced from a research herd (Fort Dodge, Iowa) and were serologically negative to *E. rhusiopathiae*. Pigs were divided into two groups and group 1 (n=23) were vaccinated with the live attenuated vaccine through the drinking water at 6 weeks of age. The second vaccination was given two weeks post first vaccination. Thirteen (13) pigs were used as unvaccinated controls. At 14.5 weeks all pigs were challenged intramuscularly with a virulent strain of *Erysipelothrix rhusiopathiae*. All challenged pigs were observed for seven days post challenge for temperature and clinical signs associated with erysipelas infection.

**Results**

In the safety study five *Erysipelothrix rhusiopathiae* negative pigs were vaccinated by deep intranasal inoculation then followed for 14 days. Nasal swabs were collected daily for five days and clinical observations were made daily for 14 days post-vaccination. No organisms were recovered from the nasal swabs in the first vaccination replicate. A second replicated including 10 pigs yielded similar results. Thus the live attenuated *E. rhusiopathiae* strain did not appear to become persistently established in pigs post-vaccination, cause any local or systemic signed consistent with *Erysipelothrix rhusiopathiae* infection in the pigs.

In the efficacy study 100% of the non-vaccinated pigs showed severe clinical signs of erysipelas, including high temperature, inappetence, depression, lethargy, generalized patchy redness and sudden death during the observation period.

**Table 1. Challenge study**

<table>
<thead>
<tr>
<th>Group</th>
<th>Treatment</th>
<th>Mortality post challenge (%)</th>
<th>Protection from clinical signs (%)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Vaccinated</td>
<td>0</td>
<td>57</td>
</tr>
<tr>
<td>2</td>
<td>Control</td>
<td>23</td>
<td>0</td>
</tr>
</tbody>
</table>

*p< 0.05. According to 9CFR113.67.

Data from this study shows that the live attenuated *Erysipelothrix rhusiopathiae* mass administered through the drinking water can partially protect from a severe challenge at 14.5 weeks post vaccination.

**Discussion**

These studies provide evidence of the safety and efficacy of a live attenuated *Erysipelothrix rhusiopathiae* vaccine in pigs. This vaccine offers a mass applied vaccination strategy for the control of clinical signs and mortality associated with erysipelas infection.

**References and Acknowledgements**

2. We wish to acknowledge Dr. Eric Neumann (Massey University, Palmerston North, 4442, New Zealand) for the conduct of the safety study.