

PROTECTING PIGS FROM FOOT AND MOUTH DISEASE BY OIL EMULSION VACCINATION: CLINICAL TRIALS
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During foot and mouth disease (FMD) outbreaks the clinical signs are sometimes observed first in pigs, to be followed at a later stage by spread to cattle. In pigs, FMD is often severe with high mortality in the young and loss of production in adults. Consequently, protection of pigs by vaccination is important for both epizootiological and economic reasons.

Aqueous FMD vaccines which have proved satisfactory for protecting cattle have not been as effective in pigs, but results to date have shown that pigs can be protected by oil emulsion vaccines (McKercher and Graves, 1977). Basarab (1978) described the development of an oil emulsion vaccine which constitutes the basis of the trials described in this report.

Large scale production of such vaccines has led to their use in controlling FMD in pigs in Spain since 1975 and in South East Asia since 1977.

Vaccines have been tested by inoculating groups of 10 week old piglets intramuscularly (i/m) with a 2ml dose of vaccine and testing their immunity by injecting a heavy challenge dose (100 pig ID₅₀) of virus into both heel bulbs of one foot. The animals were examined for signs of generalised FMD during the following 10 days (Burrows, 1966).

The accumulated results of challenge tests carried out at 7, 21 to 30 and 120 days post vaccination (dpv) in Spain, Germany, Pirbright and South America are shown in Table 1.

The success of this vaccine has led to the extension of production for the South American sub-continent and the first trivalent (O, A, C) oil adjuvanted vaccine for pigs has now been registered for general use in Brazil. Challenge tests carried out in Brazil and Argentina in 10 week old pigs have demonstrated high levels of protection. In Brazil, for instance, 100% of pigs were protected at 30 days and 56% at 120 days post vaccination (dpv), while in Argentina the corresponding levels were 94% and 88% respectively. (Table 2).

It was interesting to note that when vaccinated animals succumbed to the disease the signs were less severe than in non-vaccinated control animals.

Early protection has been investigated both in terms of onset of immunity and determination of the earliest age for effective vaccination. Ten week old piglets were challenged at 7 dpv and results of trials in England, Brazil, Spain and Argentina showed that 64 out of 104 animals (62%) were protected at that stage. (Table 1).

Vaccination at 1, 3 or 5 weeks of age protected the majority of piglets from challenge regardless of whether they were derived from sows which had been vaccinated or not. It was demonstrated that maternally derived antibodies alone did not protect piglets from challenge 60 days after birth. Similar results have been reported by Morgan and McKercher (1977).

Subcutaneous administration of w/o vaccines produced abscess formation but reactions to i/m or intraperitoneal (i/p) vaccinations were limited and acceptable. When i/m vaccination was performed shortly before slaughter a degree of trimming of the carcass was required but when the vaccine was administered 3 to 4 months before slaughter only a small proportion of carcasses possessed a small nodule 1 to 2cm in diameter at the site of inoculation. Local reactions to i/p vaccination were so slight as to be difficult to detect.

The immunity conferred by w/o vaccine was independent of whether it was administered by the i/m or i/p route.

The vaccine has been shown to be safe in all age groups of pigs. Safety tests showed that there were no ill effects after vaccinating a complete breeding herd of 754 animals in Brazil, many of which were sows in various stages of gestation.

References

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TABLE 1
 Accumulated results of challenge tests

	Days Post-Vaccination		
	7	21/30	120
Protected/Challenged	64/104	357/432	99/126
% Protected	62	83	79

TABLE 2
 Results of Challenge Tests in Brazil/Argentina

	Days Post-Vaccination		
	7	30	120
BRAZIL			
Protected/Challenged	7/16	16/16	9/16
% Protected	44%	100%	56%
ARGENTINA			
Protected/Challenged	12/16	15/16	14/16
% Protected	75%	94%	88%