The difficulty in the prevention and control of swine dysentery (SD) is the lack of suitable diagnostic tests to differentiate between swine infected with T. hyodysenteriae and T. hyousenteriae-like organisms. The indirect fluorescent antibody test has been employed for the diagnosis of SD. However, its efficacy has been hampered by difficulties encountered with cross-reactivity of T. hyodysenteriae-like organisms (Terpstra et al., 1978). One test presently employed in the detection of antibodies to T. hyodysenteriae is the microtiter agglutination test (MAT) (Joens, 1978). This test is laborious to do, requires a minimum of about 2 days due to difficulties in the settling pattern of the antigen, and is also subject to cross-reactivity of enteric organisms. Cross-reactivity has also been encountered in a hemolysis test (Jenkins et al., 1976).

Currently, the successful use of the enzyme-linked immunosorbent assay (ELISA) for immunodiagnosis of several infectious diseases has made it attractive to hypothesize that the ELISA may be useful in the diagnosis of SD (Carlsson et al., 1977; Veldkamp and Vlaiken, 1973). The ELISA is economical and safe. The purpose of this investigation was to develop a sensitive ELISA for the rapid immunodiagnosis of SD.

In the development of the ELISA, polystyrene microtiter plates were coated with 960 µl of antigen derived from T. hyodysenteriae suspended in sodium carbonate buffer (0.1 M, pH 9.5). The plates were washed 3 times with phosphate buffered saline (PBS) containing 0.05% Tween-20. A 200 µl volume of diluted serum (1:10) was added to each well, and the plates then incubated at 35°C for 3 hours. Following incubation, the plates were washed with PBS/Tween-20, and a 500 µl volume of anti-rabbit IgG conjugated to alkaline phosphatase enzyme was added. Plates were then incubated for 1 hour at 37°C.

To determine the presence of enzyme-linked IgG bound to the antigen-coated plates, 200 µl of p-nitrophenyl phosphate was added, and the plates were incubated for 30 minutes in a water bath (37°C). The reaction was stopped with 50 µl of 1 M NaOH. The presence of T. hyodysenteriae was established by measuring the absorption at 405 nm on a Spectronic 20 spectrophotometer. Serum samples showing an extinction coefficient (EO) of greater than or equal to 0.21 were considered positive. Of a total of 40 sera tested from pigs known to be affected with SD using particular antigen of T. hyodysenteriae, 21 were strongly positive (EO > 0.21), and 19 were negative. In contrast, when 540 serum samples randomly selected from herds with unknown history of SD were tested, 17 or 40% were positive. When 3 different antigens (TCA-extracted, phenol extract antigen, and sonicated antigen of T. hyodysenteriae) were compared, there was no significant difference in the number of positive reactions obtained on the same sera of known or unknown history.

Conclusions:
The ELISA was found to be superior to the MAT in detecting serologic activity since it was able to detect a greater number of sera containing antibody to T. hyodysenteriae. The advantage of ELISA in this respect may have been attributed to its extreme sensitivity, since the assay has the capability to detect minute quantities of antibody. However, one disadvantage of the ELISA was the lack of specificity which was indicated by numerous false positives as well as the discrepancy in the uniformity of the background reaction from one control sera to the other.


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