**Erysipelothrix rhusiopathiae** detection by PCR and strain characterization by genotyping

**Fact sheet**

**ERY-PCR**

A newly developed PCR test for detection of *Erysipelothrix rhusiopathiae* (ERY-PCR) in clinical samples is now available at the University of Minnesota Veterinary Diagnostic Laboratory. This test can detect a minimum of 10⁴ CFU/ml (Fig. 1 A) and was shown to be specific for detection of *E. rhusiopathiae* when tested using DNA extracted from the following swine pathogens: *Haemophilus parasuis*, *Actinobacillus pleuropneumoniae*, *Actinobacillus indolicus*, *Actinobacillus equuli*, *Actinobacillus suis*, *Actinobacillus rossii*, *Bordetella bronchiseptica*, *Escherichia coli*, *Pasteurella multocida*, *Salmonella* sp., and *Streptococcus suis*.

The PCR test was validated using clinical samples experimentally inoculated with *E. rhusiopathiae* and tissues from naturally infected pigs. Tissue homogenate from aborted fetuses inoculated with a known concentration of *E. rhusiopathiae* were positive by PCR, indicating that the new test was not affected by PCR inhibitors usually present in clinical samples (Fig. 1 B). PCR was also positive when tissues from naturally infected pigs were tested (Fig. 2). PCR was negative when pathogens other than *E. rhusiopathiae* were isolated from samples, such as *Arcanobacterium pyogenes*, *Streptococcus suis*, and *Pasteurella multocida*, or when isolation for *E. rhusiopathiae* was negative (no growth).

**Figure 1.** Sensitivity of the newly developed *E. rhusiopathiae* PCR using 10-fold dilutions of a pure culture (A) and tissue homogenates (B) from aborted fetuses before (1, 2, 3, 4, 5, 6) and after inoculation with a known concentration of *E. rhusiopathiae* (1S, 2S, 3S, 4S, 5S, 6S). M – Molecular weight marker.

**Figure 2.** ERY-PCR results for tissue homogenates from 3 pigs diagnosed with *Erysipelothrix rhusiopathiae* systemic infection based on histopathology and bacterial isolation. M – Molecular weight marker.

The new ERY-PCR can be used as an alternative tool to diagnose *E. rhusiopathiae* systemic infections and to define the role of this pathogen in swine abortion cases. It can also be used in conjunction with bacterial culture to increase the chances of detecting *E. rhusiopathiae* in chronic cases.

**Samples to be submitted for testing (refrigerated):**

1. Swine tissues including skin, lung, liver, and spleen.
2. Aborted fetuses
Erysipelothrix rhusiopathiae genotyping

The University of Minnesota Veterinary Diagnostic Laboratory is now offering routine genotyping and genetic analysis of *E. rhusiopathiae* isolates. Isolates recovered from clinical cases are genotyped and a computer-based analysis is performed to create a dendrogram (Fig 3). The dendrogram contains not only the genomic fingerprint of each isolate, but also detailed clinical information such as date of isolation, herd and site identification, age of affected animals, organs from which the bacterial isolates were recovered, lesions associated with isolation, and antibiotic resistance profiles.

The dendrogram can be used to evaluate the genetic variability of *E. rhusiopathiae* isolates from a specific herd. It can also be used for selection of strains to be used in autogenous vaccines. A database is created for each herd, and isolates from new clinical cases can be genotyped and compared to previous isolates and to vaccine strains.

**Figure 3.** Genetic analysis of 3 *Erysipelothrix rhusiopathiae* isolates recovered from clinically affected pigs. Three different strains were identified by genotyping (ERY0001, ERY0002, and ERY0003). Strains ERY0001 and ERY0002 were found to be closely related.

Sample submission:

1. *Erysipelothrix rhusiopathiae* isolates are necessary for genotype testing.

2. Swine tissues (including skin, lung, liver, and spleen) or aborted fetuses can be submitted for bacterial isolation and genotyping.

3. *Erysipelothrix rhusiopathiae* isolates can also be forwarded to the University of Minnesota Veterinary Diagnostic Laboratory for genotyping alone.

If you have any questions about these procedures, or proper submission of samples, please contact Dr. Kurt Rossow or Dr. Jim Collins at 1-800-605-8787 or by Email at vdl@umn.edu.