



## Research Project: [Microbial Modeling and Bioinformatics for Food Safety and Security](#)

Location: [Microbial Food Safety Research Unit](#)

Title: Clonality and Antibiotic Susceptibility of *Yersinia enterocolitica* Isolated From U.S. Market Weight Hogs

### Authors:

- [Bhaduri, Saumya](#)
- [Wesley, Irene](#)
- Richards, Harry - UNIV. OF TENNESSEE
- Draughon, Ann - UNIV. OF TENNESSEE
- Wallace, Morgan - DUPONT QUALICON

Publication Date: April 1, 2009

**Interpretive Summary:** *Yersinia enterocolitica* is a bacterium that is a common cause of food-borne illness in humans. Swine are the only known reservoir for the disease-causing (pathogenic) *Y. enterocolitica*, and this bacterium is a serious concern in pork production and the processing industry in the United States. A national study, the National Animal Health Monitoring System (NAHMS) Swine 2000, on the occurrence of pathogenic *Y. enterocolitica* in swine in the United States was facilitated by the United States Department of Agriculture (USDA), and the Animal and Plant Health Inspection Service (APHIS) in collaboration with the USDA-Agricultural Research Service (ARS). Analyses of variety of growth factors, and genetic factors showed that *Y. enterocolitica* isolated from swine feces are potentially capable of causing food borne illness. Furthermore, antimicrobial resistance profiles of these isolates were evaluated and correlated with pathogenicity of this organism. The results of the study indicate that swine in the United States harbor pathogenic *Y. enterocolitica* and are a potential reservoir for strains that cause human illness. Since pork safety begins on the farm, pork producers play a critical role in providing safe pork products for United States and international consumers. The data collected in the NAHMS Swine 2000 study will provide information to the pork industry on the risk factors, prevalence and epidemiology of this pathogen.

**Technical Abstract:** Pigs are the only known animal reservoir of *Yersinia enterocolitica* pathogenic to humans. In this study 106 ail-positive pathogenic *Y. enterocolitica* isolates, previously recovered from 2,793 swine fecal samples (3.8%) collected during National Animal Health Monitoring System's Swine 2000 study, were examined. The presence of the previously described virulence plasmid, expression of plasmid-associated virulence determinants, and serotype were correlated with genotype, expression of YopE protein and antibiotic susceptibility. All isolates contained the virulence plasmid and expressed virulence-associated phenotypic characteristics. The 25kD YopE protein was present in 104 of 106 isolates. PFGE using the enzyme XbaI showed that O:3 and O:5 isolates were highly clonal within a serotype regardless of state of origin. Antimicrobial resistance profiles of 106 isolates of serotypes O:3



and O:5 were evaluated by agar disc diffusion methodology to 16 different antibiotics. All isolates were susceptible to 13 of the tested antimicrobials; resistance was noted to ampicillin, cephalothin, and tetracycline. The presence of the *ail* gene, virulence plasmid, the expression of virulence determinants and serotypes indicate that these isolates from US swine are potentially capable of causing human food-borne illness.

**Citation:** Bhaduri, S., Wesley, I.V., Richards, H., Draughon, A., Wallace, M. 2009. Clonality and Antibiotic Susceptibility of *Yersinia enterocolitica* Isolated From U.S. Market Weight Hogs. *Foodborne Pathogens and Disease*. 6(3): 351-356.