RESEARCH ABSTRACT

PORK SAFETY

Title: Development of a Microarray for the Rapid and Simultaneous Detection and Tracking of Bacterial and Viral Foodborne Pathogens (**NPB-05-072).**

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Abstract:

Foodborne diseases are increasingly recognized as a significant global public health problem despite major advances and improvements in hygiene, the quality of food, water and sanitation. Detection and characterization of the pathogens during outbreak scenarios usually takes a lot of time. The main aim of the proposed research program was to develop oligonucleotide based microarray for rapid, sensitive and definitive detection, diagnosis and characterization of the most important infectious bacterial (*Campylobacter, Salmonella* and *Yersinia*) and viral (Noroviruses) pathogens found in swine and pork. We also compared two different microarray techniques based on probe design, assembly and probe conformation on the slide. The second aspect of this project involved development of an efficient method to concentrate and purify low levels of these pathogens from fecal and environmental samples in the pork production environment.

A total of 272 target regions and genes were identified that were specific for pathogen identification and characterization of the antimicrobial resistance and virulence determinants. We designed multiple probes (up to three) per gene to increase the sensitivity and specificity of the microarray. After BLAST analysis of the probes, a total of 562 probes were finally selected to be printed on to glass slides. Appropriate control strains that were previously characterized in our laboratories by PCR were selected to test the new arrays. Preliminary results indicated that the probes designed were highly specific and sensitive for identification of the pathogen and the known resistance and virulence genes present in the selected control strains. Both the microarray methods employed gave results that attested the sensitivity and the specificity of the probes selected.