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Detection of non-pcr amplified *s. enteritidis* genomic dna from food matrices using a gold-nanoparticle dna biosensor: A proof-of-concept study

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Bacterial pathogens pose an increasing food safety and bioterrorism concern. Current DNA detection methods utilizing sensitive nanotechnology and biosensors have shown excellent detection, but require expensive and time-consuming polymerase chain reaction (PCR) to amplify DNA targets; thus, a faster, more economical method is still essential. In this *proof-of-concept* study, we investigated the ability of a gold nanoparticle-DNA (AuNP-DNA) biosensor to detect non-PCR amplified genomic *Salmonella enterica* serovar Enteritidis (*S. enteritidis*) DNA, from pure or mixed bacterial culture and spiked liquid matrices. Non-PCR amplified DNA was hybridized into sandwich-like structures (magnetic nanoparticles/DNA/AuNPs) and analyzed through detection of gold voltammetric peaks using differential pulse voltammetry. Our preliminary data indicate that non-PCR amplified genomic DNA can be detected at a concentration as low as 100 ng/mL from bacterial cultures and spiked liquid matrices, similar to reported PCR amplified detection levels. These findings also suggest that AuNP-DNA biosensors are a first step towards a viable detection method of bacterial pathogens, in particular, for resource-limited settings, such as field-based or economically limited conditions. Future efforts will focus on further optimization of the DNA extraction method and AuNP biosensors, to increase sensitivity at lower DNA target concentrations from food matrices comparable to PCR amplified DNA detection strategies.

Biography

Sylvia A. Vetrone received her Ph.D. in Molecular, Cellular and Integrative Physiology from the University of California, Los Angeles in 2008. He has been teaching at Whittier College sine 2006. Along with her teaching and research, she also serves as a coordinator for the Mellon Mays Undergraduate Fellowship and the HHMI STEM Research & Teaching Fellowship. Vetrone is a member of the HACU Advisory Committee and Faculty Caucus, the Society for Advancement of Chicanos and Native Americans in Science, and the Institute for Biological Engineering. Her research interests are disease pathology, cellular oxidative processes, and biosensor applications.

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