RESEARCH ABSTRACT
PORK SAFETY

Title: The development of a novel immunosensor to detect *Salmonella* - **NPB #02-027**

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Date Received: May 28, 2003

Abstract: *Salmonella* contamination in foods results in not only foodborne outbreaks, but also a large economical burden for the industry due to product recalls. As a result, a fluorescence resonance energy transfer (FRET)-based method was developed to detect *Salmonella*. Sensors utilizing FRET switch their fluorescence wavelength between donor and acceptor fluorophores as the distance between the two fluorophores change. This change in distance is a result of the conformational change in the 3D structure of the antibody as it binds to the target antigen. *Salmonella* antibodies were labeled with FRET donor fluorophores (Alexa Fluor 546) while protein G or A was labeled with the acceptor fluorophores (Alexa Fluor 594). The labeled antibody-protein G or A complex was formed via incubation of the labeled antibody with protein G/A which specifically attaches to the Fc fragment of antibodies. The labeled antibody-protein G or A complex was tested in solution and specific and non-specific antigens were exposed to the in solution complex. Changes in fluorescence were monitored by a spectrofluorometer. For “in-solution” tests, the optimal acceptor/donor fluorophore (A/D) ratio was 1.0 for *Salmonella*, and *Salmonella* antigen detection limits were 2.0 µg/ml. Immobilization studies were also performed where the protein/antibody complex was immobilized to an optical fiber and interface with a benchtop fluorometer. The results showed the limit of detection was 10^3 cells/ml of *Salmonella* Typhymurium at a packing density of 0.033 mg/ml.