# Magnetic bead based immuno-detection of *Listeria monocytogenes* and *Listeria ivanovii* from infant formula and leafy green vegetables using the Bio-Plex suspension array system

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Listeriosis, a disease contracted via the consumption of foods contaminated with pathogenic *Listeria* species, can produce severe symptoms and high mortality in susceptible people and animals. The development of molecular methods and immuno-based techniques for detection of pathogenic *Listeria* in foods has been challenging due to the presence of assay inhibiting food components. In this study, we utilize a macrophage cell culture system for the isolation and enrichment of *Listeria monocytogenes* and *Listeria ivanovii* from infant formula and leafy green vegetables for subsequent identification using the Luminex xMAP technique. Macrophage monolayers were exposed to infant formula, lettuce and celery contaminated with *L. monocytogenes* or *L. ivanovii*. Magnetic microspheres conjugated to Listeria specific antibody were used to capture Listeria from infected macrophages and then analyzed using the Bio-Plex 200 apparatus. As few as 10 CFU/mL or g of *L. monocytogenes* was detected in all foods tested. The detection limit for L. ivanovii was 10 CFU/mL in infant formula and 100 CFU/g in leafy greens. Microsphere bound *Listeria* obtained from infected macrophage lysates could also be isolated on selective media for subsequent confirmatory identification. The method presumptively identifies *L. monocytogenes* and *L. ivanovii* from infant formula, lettuce and celery in less than 28 hours with confirmatory identification completed in less than 48 hours. While FDA focuses its regulatory microbiology methods on development of high throughput techniques, this method is useful for the isolation of *L. monocytogenes* from food samples containing high levels of competitor microorganisms that make it difficult to obtain discrete colonies on plating agars.

### Speaker Biography

James B Day is a Research Microbiologist at the U.S. Food and Drug Administration in College Park, Maryland, where he is involved in developing detection methodologies for bacterial pathogens in contaminated foods. He has developed techniques for rapid identification of *Francisella tularensis, Salmonella enterica* and *Listeria monocytogenes* in various food matrices and recently established a novel macrophage-based assay for enrichment of intracellular bacterial pathogens for enhanced identification. He earned his PhD from the University of Miami School of Medicine (UM), where he worked on bacterial pathogenesis of *Yersinia pestis*. At UM, he developed a widely used system to measure virulence protein secretion and host cell translocation. He went on to complete his Postdoctoral studies at Harvard Medical School, where he worked on type III secretion mechanisms of *Salmonella enterica* as well as regulatory factors that control virulence protein induction.

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