

## A Multiplex Real-Time PCR Assay for the Detection of Highly Pathogenic *Salmonella* Enterica (HPS) in Beef and Poultry

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The USDA and industry work to find a balance to continue to offer wholesome, nutritious meat products while reducing risk of illness from *Salmonella* for humans. There is a need in the poultry and beef industries for an easy-to-use method to identify the risk of *Salmonella* in food samples based on virulence or pathogenicity, instead of simply presence or absence. This work involved the development of a real-time PCR assay to detect *Salmonella* in relevant food samples based on genes associated with pathogenicity. This multiplex PCR assay is designed with three HPS targets (HPS-B, HPS-A, HPS-X) associated with virulence, and combine with a *Salmonella* spp. target and an internal control. Analysis of enrichments and isolates from chicken, turkey, pork and beef samples from regulatory (USDA-FSIS) or industry were prepared for specificity and applicability study. Specificity studies yield 100% inclusivity on 202 *Salmonella* serovars and 100% exclusivity on 53 closely related species of *Enterobacteriaceae*. Further, the assay was tested on enriched samples and isolates from each of the 4 major commodities: chicken, turkey, pork, and beef, and compared to data gathered by USDA-FSIS. Of the 129 isolates evaluated, the multiplex real-time PCR assay result agreed with the USDA data for the HPS-B, HPS-A, HPS-X, and *Salmonella* spp. targets with an accuracy of 99.2%, 98.4%, 99.2%, and 100%, respectively. The results support the assumption that highly pathogenic *Salmonella* can be quickly detected in meat and poultry with this next-generation method for *Salmonella* detection. This approach to *Salmonella* testing can enable the industry to make more risk-based decisions about their product to reduce the number of illnesses caused by *Salmonella* while continuing to provide consumers with nutritious and affordable meat.

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