One-Step Rapid Detection of *Salmonella* Contamination

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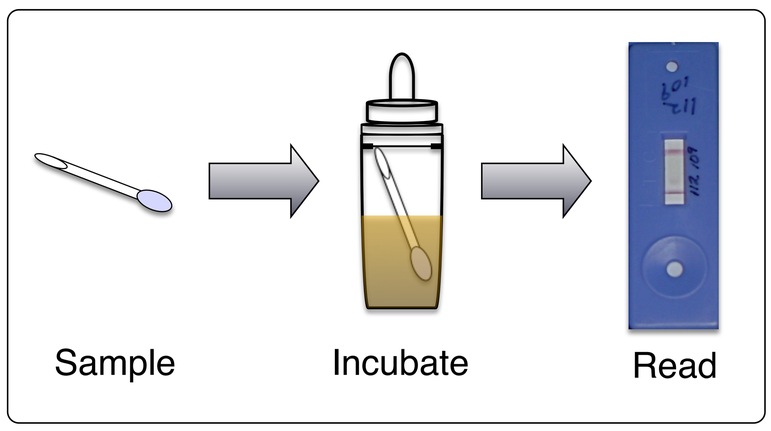
Summary: Rapid, simple and accurate detection of *Salmonella* bacteria remains a key unmet need in food, environmental and clinical applications. Bacteriophage Amplification Technology is a surrogate marker technology that enables Salmonella detection by simple immunoassays in just a few hours in a single-step procedure. No pre-enrichment step is required. In addition to rapid time-to-results, we show that our bacteriophage cocktail reacts with a wide range of Salmonella serovars, and exhibits excellent specificity.

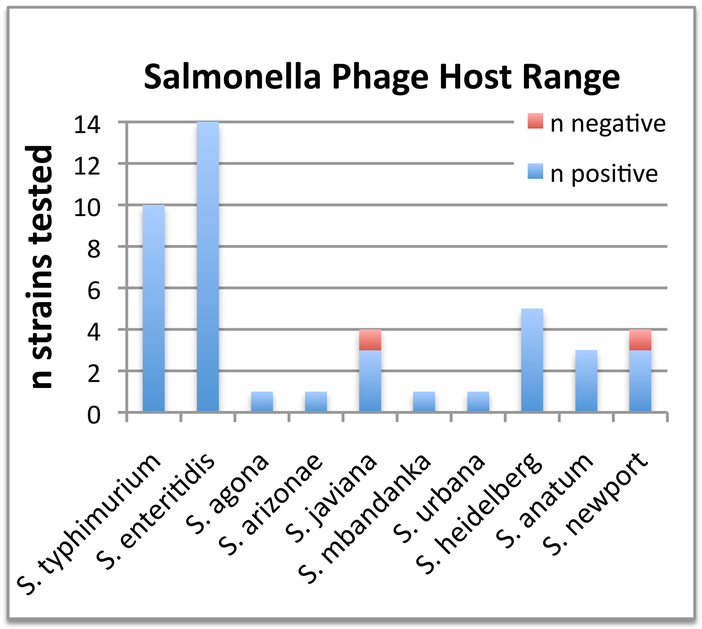


Technology: Bacteriophage are bacterial viruses that can be selected for the ability to specifically infect a given bacterial species. Phage infection comprises a spontaneous amplification system: one infected cell will produce 100-1000 progeny phage in about an hour. Each phage particle contains hundreds of copies of capsid protein.

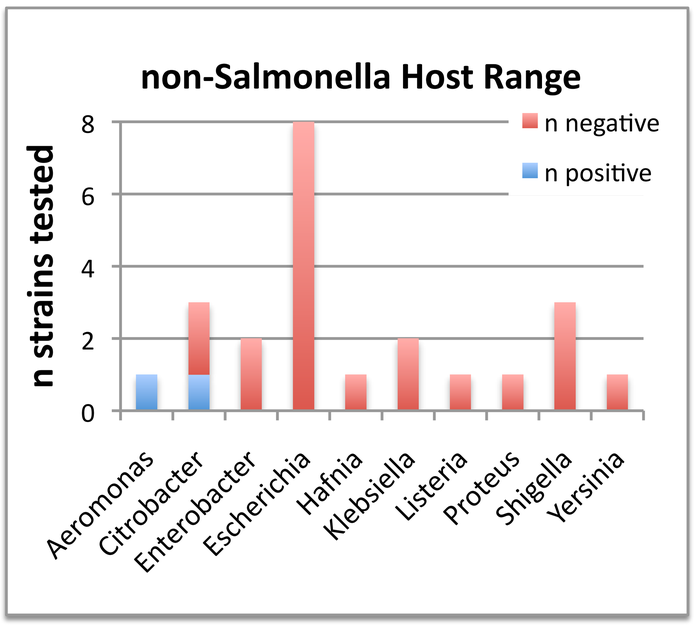
In a sample that contains the target bacteria, phage infection results in high amplification of capsid protein, which can be conveniently detected by simple immunoassay technology.

No instrumentation or expensive reagents are required to develop a highly sensitive and specific assay.

Host Range Results: A cocktail of two proprietary bacteriophage were tested for amplification against a panel of *Salmonella* serovars, and a panel of non-target bacterial species.



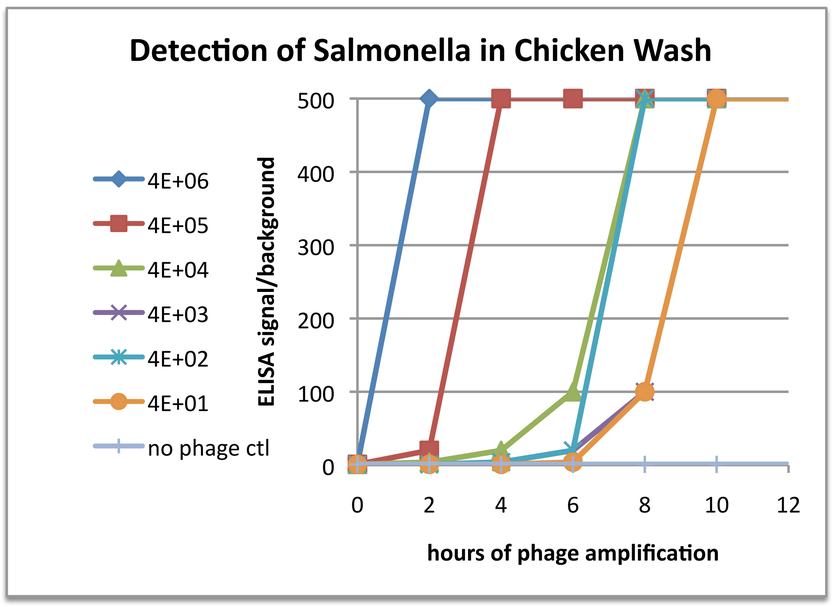
Total *Salmonella* reactivity:
42/44 = 95% sensitivity



Total non-*Salmonella* reactivity:
2/24 = 92% specificity

Host Range Methods: Bacteriophage suspensions were spotted on lawns of test bacteria and scored positive if they exhibited confluent lysis.

Immunoassay Results: *S. typhimurium* was spiked into chicken wash fluid and added to broth and bacteriophage. Samples were withdrawn and assayed by standard ELISA methods using a polyclonal anti-capsid antibody at the indicated times.



Methods: Sterilized chicken parts were incubated overnight in 45 ml saline. The saline wash was spiked with *Salmonella* at the indicated concentrations, and mixed 50:50 with bacteriophage-containing broth and incubated at 37° for the amplification reaction.

Conclusions: Bacteriophage amplification accelerates detection of *Salmonella*, allowing detection of a few hundred cfu in less than 6 hours. Bacteriophage amplification has excellent host range across a wide spectrum of *Salmonella* serovars, while retaining very good specificity against non-target bacterial species.