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Multiplex Solid-Phase PCR for Rapid Detection and Identification of *Salmonella* spp. at Sub-species

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This study presents a solid-phase PCR (SP-PCR) for rapid detection, identification, and sub-typing of various *Salmonella* species, the major food-borne cause of salmonellosis. The target DNA is firstly amplified with PCR primers (one primer is labeled with fluorophores) in the liquid phase. Simultaneously on the solid phase, the amplified PCR amplicons interact with the nested DNA probes immobilized on the solid substrate as an array. If the immobilized probes match the sequence of the DNA templates they are extended by the polymerase and serve as template for the second strand elongation primed by the liquid phase primer thus generating new templates for the SP-PCR. After the reaction, PCR products labeled with fluorophores remain attached to the substrate and can be visualized directly by fluorescence readout devices. Using this method, *S. enteritidis*, *S. typhimurium* and *S. dublin* can be detected at the same time. The method offers several advantages over conventional multiplex PCR: less competition between different primer pairs thus increasing multiplexing capability, only single wavelength optical readout needed for the multiplexing detection, and less time-consuming owing to reduction of the post-PCR gel electrophoresis. The method will be useful for development of point-of-care devices for rapid detection and identification of *Salmonella* spp.

A solid-phase PCR for rapid detection and identification of *S. enteritidis*, *S. typhimurium* and *S. dublin* is developed. The method offers advantages such as better multiplexing capability, only single wavelength optical readout needed, and less time-consuming.