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Real-Time PCR for Detection of Salmonella spp. in Environmental Samples

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The methods currently used in FDA field laboratories and other public health laboratories for detecting Salmonella in food / environmental samples require 2 days and have limited sensitivity. We describe the development and validation of a real-time PCR method that detected Salmonella and presence of group D in 24 h. Primers and probes specific to t h e invA gene of Salmonella, group D, and Enteritidis serovar were designed and evaluated for t h e inclusivity and exclusivity using a panel of 329 Salmonella isolates consisting 126 serovars from 32- O groups and 22 non-Salmonella environmental organisms. The invA-, group D- andEnteritidis-specificsets identified the isolates accurately. The PCR method was100% inclusive for Salmonella spp and had a detectio n limit of 2 copies of Salmonella DNA per reaction. A Single-laboratory validation performed on 1,741 environmental samples demonstrated that the PCR method detected 55% more positives than the VIDAS method that is currently used. The method is more specific and did not report any false-negatives. The receiver operating characteristic (ROC) analysis documented excellent agreement between the results from the culture and PCR methods (area under the curve, 0.90; 95% confidence interval of 0.76 to 1.0) confirming the validity of the PCR method. The validated PCR method will help to strengthen public health efforts through rapid screening of Salmonella spp. in environmental samples.

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