Title Application of internal amplification control in the PCR detection of food-borne Salmonella

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Abstract

Introduction: PCR technology had been applied widely in the detection of foodborne pathogens for its high sensitivity, specificity and rapidness. However, the detection method was not the legitimate criterion in the most countries. Its disadvantages had emerged in practical applications. For example, the inhibitors in food and medium would interfere the PCR reaction to result in false-negative. Fortunately, some means capable to resolve the problem were invented, e.g., artificial construction of an internal amplification control (IAC) in PCR test to indicate the false-negative. **Materials and methods:** In order to avoid the false-negative and promate the accuracy in PCR detection of *Salmonella*, and IAC fragment was constructed, which was far heterologous to the target gene *invA*, to co-amplify with targeted *invA* gene under the same primer pairs' leading. Moreover, this IAC fragment was added in PCR system in this study, which was different from the previous reports. **Results and discussions:** The IAC-PCR detection system for foodborne *Salmonella* was evaluated for specificity, sensitivity, anti-interference ability and accuracy. Specificity: there was a 374-bp amplicon resulted from all *Salmonella* strains, while only a 513-bp IAC amplicon appeared after the amplification for all non-*Salmonella* strains. Sensitivity: the detection limit of this PCR system for pure *Salmonella* DNA was 12.8 fg/μL and for artificially inoculated milks was 8 efu/25 mL after 8h-enrichment in buffered peptone water. Accuracy: 80 samples of seriously contaminated milks were tested, and 3 samples seemed to be negative without IAC in PCR reaction, whereas, the 3 sample turned out to be false-negative (with neither target amplicon nor IAC amplicon) with IAC in PCR reaction. The result demonstrated that the system with IAC could successfully eliminate the false-negative. In conclusion, the IAC-PCR detection system established in this study could successfully eliminate the false-negative. Moreover, the whole test was rapid, accurate, specific, and sensitive, which could be a robust alternative for the legitimate detection criterion for *Salmonella* detection.