A quantitative detection and identification of clinically important pathogen based on capillary electrophoresis coupled with multiplex PCR

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Rapid diagnosis of bacterial infections has been strongly considered as important criteria for an appropriate therapy of bacteria-induced disease in the early phase. Currently, improved schemes have been developed such as CE-SSCP combined with 16S rRNA gene-specific PCR has come into the spotlight by reason of its benefits such as high sensitivity, resolution and great reproducibility. In this study, we developed a novel and powerful technique, complementing existing CE-SSCP diagnosis, for rapid quantification and identification of target pathogens. PCR primers were designed for the optimal separation of their products in CE-SSCP using the stochastic model that leads to avoid experimental efforts for CE peak identification. Then multiplex PCR conditions were optimized in order to obtain linear correlation between peak area and the concentrations of the target pathogens. As a model system, clinically important bacteria were identified and quantified simultaneously. The results demonstrated the huge potentials of this method on pathogen diagnosis and high-throughput drug discovery.