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PERFORMANCE EVALUATION OF REAL-TIME PCR INSTRUMENTS

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Objective:

Real-time PCR instruments from Applied Biosystems (7900HT), Cepheid (Smartcycler), Corbett Research (Rotor-Gene), MJ Research (Opticon) and Stratagene (Mx4000) were compared with regard to detection sensitivity, linearity, uniformity and precision.

Methods:

Real-time PCR with SybrGreen detection of genomic DNA from *Staphylococcus aureus* was used as a model system to evaluate the performance of each instrument. The genomic DNA was tested in two-fold serial dilutions, from a single copy to approximately 2,100 genomic copies.

Results & Conclusions:

Using SybrGreen detection of *Staphylococcus aureus* genomic DNA as model system, one genomic copy was reproducibly detected by the 7900HT and the Opticon. Three genomic copies were detected with the Mx4000 and Rotor-Gene and seven with the Smartcycler, respectively, in a reproducible manner. For the latter instruments, the reproducible detection of lower genomic copy numbers was confined by the formation of primer dimers. The earliest detection of one genomic copy of *Staphylococcus aureus* was observed in the 7900HT with a Ct value of 31.5 +/- 1.279 (% CV). The instrument precision for the Tm value was best for the Smartcycler with a Tm of 85°C +/- 0.160 (% CV), the Opticon with a Tm of 83.9°C +/- 0.220, and the 7900HT with a Tm of 84.5°C +/- 0.265. The amplification and detection was linear over a range of 10 to 2100 genomic copies for all instruments with a R2 value of 0.99 for the 7900HT, Opticon, and Rotor-Gene and a R2 value of 0.98 for the Mx4000 and the Smartcycler. The detailed comparison will be presented in the poster.