RAPID HUMAN IDENTIFICATION: EVALUATION OF THE RAPIDHIT™ 200

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The forensic science community has been effectively using traditional methods of Short Tandem Repeat (STR) analysis for more than twenty years, through PCR amplification and gel or array-based capillary electrophoresis. Emerging technologies offer the ability to advance the speed and mobility of the STR analysis process. One such platform is the RapidHIT™ 200 system from IntegenX, which combines the cell lysis, DNA purification, quantification, amplification, and capillary electrophoresis steps into one bench-top unit that generates an STR profile from cheek swabs in less than 90 minutes. The instrument is currently capable of providing investigative leads through the analysis of reference samples. When employed in police stations, rapid testing results can be compared to local databases of unsolved casework, or can be compared, if acceptable in the relevant jurisdiction, to state and federal databases. We have evaluated the RapidHIT™ to determine if the instrument is ready to be adopted by the forensic community. Contamination and reproducibility studies illustrated the platform's ability to outperform traditional bench top methods when dealing with freshly collected (pristine) samples. Analysis of baseline noise resulted in an analytical threshold (AT) of 900-1500 RFU for detection of true allelic peaks, with typical peak heights well over 12,000 RFU. Peak height ratios for profiles at different levels of intensity were used to determine a stochastic threshold (ST) to guard against falsely reporting homozygote profiles. Finally, a study was conducted to assess how the RapidHIT™ 200 handles aged samples, to determine potential impacts of storing samples prior to rapid DNA analysis.