

AUTOMATED EXTRACTION AND QUANTIFICATION OF DNA FROM CRIMINAL OFFENDER SPECIMENS STORED ON A VARIETY OF SUBSTRATES

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The large number and uniform composition of criminal offender samples to be processed for the CODIS database necessitates the development of high-throughput, automated systems for DNA extraction and quantification. A high-throughput, automated system was developed that utilizes robotic liquid handlers, bar-coded sample tracking, and database interactions to extract DNA into solution from FTA® stain cards, stained cotton cloth, buccal swabs, and blood. The DNA samples and standards are robotically added to a microtiter plate containing fluorescent dye. This plate is read by a fluorimeter that calculates the DNA concentrations based on a standard curve. The quantification information is queried by an application that also controls the robotic workstation, which automatically normalizes the DNA to working concentrations.

Performance aspects of this system including average DNA yields, dye comparisons, and future enhancements are discussed. The quantification standards for the most recent fifty assays had a c.v. of 0.12; repetitive measurements of a dilution series of DNA targets had c.v.'s less than 0.10. Signal to noise in this assay at normal DNA concentrations is 18:1. This high-throughput system is scalable, reliable, and reproducible.