

AUTOMATED METHODS FOR PROCESSING SAMPLES STORED ON FTA® PAPER

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FTA® paper is cellulose-based matrix impregnated with chemicals that lyse cells and also protects and stabilizes DNA for long-term room temperature storage. FTA® paper has been used for several years in the forensic file for the collected and storage of blood samples. Blood preserved on FTA® has been shown to remain amenable to PCR for at least 10 years.

The steps involved in the use of FTA® for DNA analysis are quite simple; a small portion of the sample, “a punch”, is removed from the FTA® card then washed using a reagent to remove heme and other enzymatic inhibitors. Appropriate amplification reagents are then added to the punch and PCR analysis is carried out under standard conditions. Until recently, the punching and processing of FTA® samples was a completely manual process. Manual manipulation of punches is not only labor intensive, but may also produce inconsistent results due to processing variation between the samples.

We have addressed the automation of FTA® punching and processing in several way to accommodate various levels of thru-put based and laboratory needs. For low to moderate volume users we have developed a semi-automated hand held coring device that greatly reduces the amount of physical work required for sample collected. We have also investigated the use of automated plate washers for the reagent washes. Together these two devices dramatically reduce the time and effort required for processing FTA® samples and increase reproductability. Data will be presented comparing samples processed by standard manual methods to samples processed using this semi-automated system. For laboratories requiring even high thru-put, a fully automated platform has been designed and built that is capable to automating any of the steps involved in FTA® use including spotting 96 well FTA plates, punching, processing, storage, and retrieval. A video clip of this fully robotic platform will be presented.

FTA® has proven itself to be robust and versatile method for the collected, storage, and analysis of DNA. With semi- and fully automated methods for punching and processing FTA®, the technology is now capable of addressing the needs of forensic labs as they move to higher thru-put.