FTA® BEYOND THE EVERDAY: NOVEL FTA® APPLICATIONS TO IMPROVE EFFICIENCY

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Empirical validation data which supports the use of FTA® cards for DNA extraction and amplification has been shown previously by this laboratory and others. Our experience using these cards has provided additional scientific data that will extend the capability of the FTA® technology beyond conventional methods and improve throughput in the production laboratory.

We have found that the FTA® extraction procedure is amenable to other types of stain cards (e.g. S&S cards). In addition, we have identified and developed procedural modifications to the established protocol that will facilitate the processing of multiple samples with greater expediency. These modifications include punching samples into a liquid medium to minimize the effects of static, eliminating the final drying step, and utilization of an automated punching device. Each of these novel applications will significantly enhance the utility and high throughput potential currently realized by the FTA® extraction method.

Customarily, a liquid blood sample is applied to the specialized FTA® card containing a proprietary clixer of extraction reagents. We have found that high molecular weight genomic DNA can also be extracted and amplified from conventional (non-impregnated) stain cards. Although the quantity of template DNA lost during the extraction process is slightly greater, sufficient template remained immobilized within the matrix of the card for amplification. The extraction protocol, specifically the use of the FTA® Purification Reagent, is otherwise unchanged. Samples previously applied to non-FTA® cards can now be processed using the GTA method instead of more conventional, less economical methods.

Manual punching devices have been limited to the Harris Micro-Punch (LTI). More automated instrumentation is available that reduces labor costs and minimizes errors during punching. The Wallac Dried Blood Spot Puncher has improved productivity and reduced punching errors and has become a valuable addition to our laboratory.

Regardless of substrate or punching device, excessive static charge in the biohazard hood is a common problem frequently encountered during the punching process. We have explored the possibility of punching the 1.2mm blood spot into liquid media to reduce the risk of samples inadvertently “jumping” into the incorrect well as a results of static charge. Three reagents were considered: deionized water, TE, and FTA® Purification Reagent. Samples were punched in duplicate, one set was extracted immediately after punching and the other set was frozen overnight and extracted the following day. Encouraging results were obtained from all three media when the extraction took place immediately after punching. Both TE and water showed appreciable results after overnight storage. However, freezing the samples overnight in FTA® Purification Reagent showed poor results.

Following the extraction, the procedure requires that the samples be completely dried before amplification. Several samples were punched and extracted in duplicate. One sample set was amplified immediately after extraction and the remaining samples were allowed to completely air dry. No decrease in amplification success was observed and no discernable difference was observed between fluorescent data obtained from the two sample sets provided that all excess liquid from the final wash is removed from the sample well prior to amplification. The ability to amplify immediately after extraction provides the analyst additional flexibility in scheduling and greatly improves throughput.

The utility of the GTA system has repeatedly proven itself conducive to the production demands of high-throughput databasing. These additional advantages further demonstrate the utility and practical application of FTA® stain cards for the collection and processing of criminal offender database samples.