VALIDATION OF THE HAMILTON MICROLAB® STARlet FOR USE IN REFERENCE AND CASEWORD DNA EXTRACTION

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In 2012 the CFS purchased five Hamilton Microlab® STARlet Robotic systems to assist us in meeting our operational goal of shifting increasing amounts of casework into the automated stream while maintaining a high quality work product. The validation project has focused on the extraction of DNA from reference samples (buccal and blood primarily) as well as simulated casework samples (crime scene swabs, bloodstains, drink containers, envelopes, cigarette butts etc.). At the CFS samples are subjected to an off-deck extraction buffer in AB Lysep columns followed by substrate removal. Samples are then purified on-deck using Promega DNA IQ, quantified using Promega's Plexor HY and amplified with AB's Identifiler Plus.

Results have shown that DNA recovery is equivalent to our current robotic platform (4.8ng current vs 4.3 ng Hamilton; total DNA from control bloodstains). Pipetting precision and accuracy are well within manufacturer's specifications (e.g. the 100ul volume measurement with a 300ul tip had a precision of 0.18% and an accuracy of 0.49%). Also of note for performance was a lack of any errors or alignment issues with regards to affixing or ejecting tips throughout the validation.

The sample tracking method we have employed for the STARlet uses barcodes affixed to 2ml sample tubes. The tubes are placed in a carrier and auto-loaded/scanned onto the instrument, which creates an electronic batch file recording their position within the 96-well plate. Database integration is used to interface with our LIMS to retrieve sample information based on the barcode as well as record batch information into an in-house batch tracking application. The auto-load function also ensures all labware (samples, tips, reagents etc.)are present on deck prior to a run, eliminating the chance of incorrect tips, plates etc. being used.
Additional experiments are currently in progress to compare extraction efficiencies between Promega's DNA IQ and Applied Biosystem's Prepfiler. Results of these experiments will also be presented.