RECOVERY OF DNA FROM ADHESIVE MATERIAL

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Latent fingerprints are commonly recovered from crime scenes using tape lifts. Advancements in the sensitivity of DNA testing allow for DNA profiles from these "touch", tape lift samples to be obtained. One drawback to DNA typing of tape lifts is that the adhesive material on the tape may inhibit DNA recovery. The purpose of this study was to maximize the recovery of DNA from the adhesive material and validate a new protocol for use on forensic casework in the HCIFS laboratory.

A liquid saliva sample on tape lifts was collected from volunteers. Deionized water, 95% ethanol and xylene (0.1%, 0.05%, 0.01%) were used on cotton swabs. Aliquots of liquid saliva with expected DNA yield of 21ng were pipetted directly onto tape lift tape. A wet/dry swabbing method was used in triplicate for all reagents. The average DNA recoveries for the wet swabs for xylene 0.1%, deionized water, xylene 0.01%, 95% ethanol, and xylene 0.05%, were 174% (36ng), 100% (21ng), 88% (18ng), 88% (18ng) and 57% (12ng), respectively.

0.1% xylene yielded no DNA (i.e., it was equivalent to the control) but with the added benefit of preventing the swab from adhering to tape lift during the collection process, it was used for validation of the method. Efficiency was tested using the wet/dry swabbing method on DNA from saliva samples of 10ng, 5ng, 2ng, 1ng, 500pg, 250pg, and 100pg. The results for wet swabs showed that the percent recovery compared to the expected DNA amounts were 96% (10ng), 106% (5ng), 114% (2ng), 64% (1ng), 83% (500pg), 21% (250pg), and 67% (100pg), respectively. This indicates that a 21-100% recovery can be expected from the wet swab. The dry swabs resulted in DNA not being detected for 2ng, 500pg, 250pg, and 100pg. The percent recoveries for the 10ng, 5ng, and 1ng ranged from 1-5% (40-53pg). The results indicate that the dry swab can be useful in some instances to assist in increasing the overall DNA recovery from the tape lift.

The contamination study resulted in no detectable DNA following the swabbing of pristine tape lifts. Reproducibility was determined using the wet/dry swabbing method for DNA recovery between two analysts. The results indicate that there was not a significant difference between average amount of DNA recovered from analyst 1 (14ng) compared to analyst 2 (11ng), $t(13)=1.39$, $p > .05$. The variance between the amount of DNA recovered by each analyst was also not significant, $F(9,9)= .25$, $p=0.05$. Accuracy and mock casework samples were also collected, which consisted of fingerprints from individuals pressed onto a tape lift. Accuracy was determined by the comparison of the obtained DNA profile from the fingerprints on the tape lift to the known DNA profile of the individual. The resulting DNA profiles were consistent with the individuals' reference samples. Mock casework samples resulted in little or no DNA from the fingerprints obtained.

These results showed that 0.1% xylene is effective at removing DNA from tape lifts while preventing the swab from adhering to the tape during collection. Additional studies using 2% SDS to increase the yield of DNA will be presented.