

EVALUATION OF A NOVEL SAMPLING DEVICE TO IMPROVE RECOVERY OF BIOLOGICAL FORENSIC MATERIAL FOR DNA PROFILING: POSSIBLE CASEWORK APPLICATIONS FOR THE MICROBIAL-VACUUM (M-VAC®)

Delmar C. Price, MS*; Jill Pogemiller, BS; and Timothy D. Kupferschmid*, MFS
Sorenson Forensics, LLC, 2495 S West Temple, Salt Lake City, Utah 84115

The purpose of this study was to evaluate whether improvements in biological material recovery from evidentiary items could be achieved using the M-Vac® (manufactured by Microbial-Vac Systems, Inc.), a sampling device originally designed for microbial pathogen collection and their safe handling. The evaluation compared traditional, existing methods of sampling commonly used and validated for casework. Traditional forensic sampling methods compared to the M-Vac® were either: (1) swabbing the entire area and consuming approximately half of each wet/dry swab; or (2) consuming a cutting of the stain. A total of four sets of DNA extractions/comparisons from blood and saliva samples spotted onto white cotton, blue denim, polyester and nylon were processed to obtain evaluation data for the M-Vac®. DNA profiles were developed from biological material recovered from all types of cloth material. Significant increases in DNA recovery were obtained with the M-Vac®, over that obtained from swabbing (more than a 100-fold increase in some cases), as determined by a forensic real-time quantitative polymerase chain reaction assay (QPCR). Sample quality was maintained with no induced sample degradation that would affect the ability to generate full DNA STR profile results. Data from this proof of concept study warrants further refinement of the engineering design of the M-Vac® for streamlined casework applications, especially for touch DNA sampling from clothing or solid surfaces.

*Corresponding authors