



A39 Optimization of Touch DNA Collection Techniques Using Alternative Swabbing Solutions

Sarah M. Thomasma, BA, Kalamazoo College, 1148 Hicks Center, 1200 Academy Street, Kalamazoo, MI 49006; and David R. Foran, PhD, Forensic Science Program, 560 Baker Hall, Michigan State University, East Lansing, MI 48824*

After attending this presentation, attendees will learn about the optimization of swabbing techniques using various solutions for acquiring low-copy number (LCN) DNA evidence from touch samples.

This presentation will impact the forensic community by improving the effectiveness of recovering cells/DNA from swabbed evidence. Various laboratory and commercial detergents were utilized, determining the highest quantity of DNA obtainable from touch samples. This will better allow DNA profiles to be generated when standard swabbing techniques may not produce enough DNA for complete analysis.

There has been minimal research into how to best obtain DNA from touch samples. Most laboratories simply moisten a swab with sterile water before swabbing evidence. The double swab technique, in which a surface is treated with a moistened swab followed by a dry swab, is also utilized, as it has been shown to recover more DNA from surfaces than a single swab in some instances. A sodium dodecyl sulfate (SDS) solution has also been used for swabbing, with the thought that the detergent might help loosen cells adhering to the surface. However, none of these methods has been objectively studied in order to maximize DNA yields.

Many components of a fingerprint/cell are relatively insoluble in water, including oils, lipid membranes, and some proteins. To make them water soluble, detergents or soaps, which have surfactant properties, can be added. These lower water tension and surround the non-polar molecules, allowing them to dissolve in water. Given this, it was hypothesized that adding surfactants to the water used to swab an object might more readily release cellular material, thereby increasing DNA yields.

Swabs moistened with sterile water were compared to those moistened with laboratory or commercially available detergents. Fingerprints were deposited using medium pressure on different substrates that had been bleached, autoclaved, and/or UV irradiated. The prints were swabbed, and DNA isolated using a standard organic extraction procedure. DNA yields were quantified using a Quantifiler™

Human DNA Quantification Kit and real time PCR, and relative yields compared. The ability to produce STR profiles was then examined. Statistical analysis allowed determination of if there was a significant difference among the various solutions in DNA recovery, and if this was associated with more complete STR profiles.

Low Copy Number DNA, Swabbing Solutions for DNA, DNA Quantity and Quality