



### **B107 Maximizing the Amount of DNA Recovered: A Study of Mawi DNA Technologies' iSWAB™-ID Collection Device for Forensic Science Application**

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After attending this presentation, attendees will understand the utility of a new device for the collection and stabilization of cells and Deoxyribonucleic Acid (DNA). Attendees will also learn about: (1) problems that may exist with the current collection and recovery of cells and DNA; and, (2) the benefits and limitations of implementing the new collection technology into the field of forensic sciences.

This presentation will impact the forensic science community by introducing a device that enhances the collection and recovery of cellular material for subsequent DNA testing. The mechanism of the device allows for an increase in specimen release into proprietary direct lysis buffer that is compatible with commonly used forensic amplification kits and produces robust and reliable Short Tandem Repeat (STR) profiling.

DNA evidence often contains low amounts of cells; therefore, the importance of proper collection and storage to protect the DNA and ensure that maximum recovery of cells is achieved cannot be overemphasized. New techniques and inventions have made the collection of DNA evidence more efficient and consistent through the development of different types of swabs, lysing buffers, and various other improvements; however, DNA specimen release can be impeded by the structural properties of the swabs and the chemistries of buffers used for collection. Relatively substantial portions of the biological material, ranging from 20%-76%, can be lost through retention on the swab or loss during the extraction process.

The purpose of this study was to define conditions and limitations of the use of Mawi DNA Technologies' iSWAB™-ID collection device for the collection of forensic samples and subsequent DNA testing. Originally, the iSWAB™-ID collection device was designed to improve bio-sampling in the medical field in underprivileged areas where refrigeration is unavailable. Its unique room-temperature-stable chemistry and device design for optimal bio-sampling can potentially be adapted for forensic purposes. Experiments were designed to answer questions about the efficiency and effectiveness of the iSWAB™-ID collection device for forensic purposes. The following parameters of the iSWAB™ buffer and collection device were tested: (1) ability to collect dried stains; (2) ability to recover cellular material from different types and conditions of swabs; (3) ability to lyse different cell types; (4) ability to stabilize DNA over an extended period of time; and, (5) ability to perform in downstream Polymerase Chain Reaction (PCR) testing and produce quality STR profiles.

The Quantifiler® Duo DNA Quantification Kit on an Applied Biosystems® 7500 Real-Time PCR instrument was used to estimate the quantity of human DNA present in each sample. For comparison with samples extracted with currently used methodologies, STR typing was performed, following DNA quantification, on all samples of DNA extracted with the iSWAB™-ID collection device using the GlobalFiler™ PCR Amplification Kit and Identifiler® Plus PCR Amplification Kit and analyzed using the GeneMapper™ ID-X software.

Cumulatively, the data indicates that the iSWAB™-ID collection device is efficient and convenient while providing enhanced DNA recovery and full, high-quality STR profiles when targeting as little as 0.5ng of DNA; however, some limits exist, which include the potential of making low-input samples too dilute for subsequent analysis. The results of this study illustrate the potential benefits and limitations of implementing the iSWAB™-ID collection device in the forensic field.

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**Biological Specimen Collection, DNA Recovery, Direct Lysis**