



A65 A Systematic Comparison of Methods for Recovery and Analysis of DNA From Handled Objects

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After attending this presentation, attendees will have learned about the relative performance of different combinations of collection, extraction, and amplification methods used to analyze samples of touch or contact DNA from materials and items relevant to the investigation of domestic and international crime scenes.

This presentation will impact the forensic science community by providing information to guide tactics, techniques, and procedures for the sampling and analysis of forensic evidence, and information on the relative probabilities of obtaining profiles from evidence in varying conditions.

DNA provides highly specific biometric identification and DNA profiles can be obtained from handled objects and even from individual fingerprints (van Oorschot 1997, Zamir 2000, Pesaresi 2003).^{1,2,3} DNA profiles from handled objects can then be compared to profiles obtained from individuals to determine the likelihood that they were the source of the DNA recovered from the object. Increasing amounts of forensic DNA evidence are being analyzed in order to obtain biometric information about the criminals and their networks. As backlogs increase for the processing and analysis of forensic DNA evidence from domestic and international crime scenes, the need grows for more efficient analytical methods. A growing variety of new collection tools, extraction methodologies, and amplification kits have been developed with the goal of providing improved DNA analysis capabilities, even for DNA that is degraded or present in low quantities. It is challenging to weigh the success of one laboratory in obtaining profiles from handled objects against the failure of another laboratory to do so when different combinations of techniques are employed (van Oorschot 1997, Ladd 1999).^{1,4}

In order to evaluate the relative performance of available methods for the collection and purification of DNA deposited on items, a systematic comparison was performed using seven different swab types with four wetting agents. In addition, organic extraction was compared to commercial extraction kits, including PrepFiler™, QIAmp DNA Investigator™, and DNA IQ™. Using the optimal swab/liquid/extraction combination, DNA was collected from a variety of objects that are relevant to typical crime scene investigations including items such as tape, wire, and cell phones. Prior to collection, subjects were asked to handle each type of object according to common instructions designed to minimize handling variability and simulate normal use of the object. Typical DNA collection and purification yields from these handled objects as determined by QuantiFiler™ analysis and the ability to produce quality STR profiles using AmpFISTR Identifiler™ PCR amplification kits will be presented.

References:

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3. Pesaresi, M., et al. (2003) Qualitative and quantitative analysis of DNA recovered from fingerprints. *International Congress Series*, 1239: 947-951.
4. Ladd, C., et al., (1999) A systematic analysis of secondary DNA transfer. *J. Forensic Sci.*, 44: 1042-1045.

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Recovery, Extraction, Analysis