Comparison of the DNA IQ™ System and SoilMaster™ Method for isolating DNA from bloodstains contaminated with soil

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Bloodstains encountered in the forensic laboratory are often compromised with regard to quantity or quality. Stains are often limited in size, degraded due to environmental insults or deposited on a substrate containing a contaminant. One of the major contaminants encountered in forensic evidence is soil.

Forensic scientists typically encounter difficulty in isolating a sufficient quantity and quality of DNA from bloodstains in or contaminated with soil. This study was undertaken in an effort to determine if DNA suitable for PCR amplification of short tandem repeats (STRs) could be isolated from soil contaminated bloodstains using the DNA IQ™ System (Promega Corp., Madison, WI) and SoilMaster™ (Epicentre, Madison, WI) extraction methods.

For this study stains were prepared by depositing blood from three individuals on three different substrates contaminated with three different soil samples. The samples were allowed to air dry and were tested with the DNA IQ™ and SoilMaster™ methods approximately one year later. Samples were quantitated using the AluQuant™ Human DNA Quantitation System and typed using the PowerPlex® 16 BIO System and the Hitachi/MiraiBio FMBIO II Fluorescence Imaging System.

Seventeen of the twenty-seven samples isolated using the SoilMaster™ method yielded amplified product and complete DNA profiles once the quantity of input DNA was optimized. The remaining ten samples failed to amplify. Conversely, the DNA IQ™ extraction method was more successful at isolating DNA from bloodstains contaminated with soil. One hundred percent (100%) of these samples yielded human DNA that was then successfully amplified and typed using the PowerPlex® 16 BIO System. This study demonstrates that successful DNA isolation can be expected from bloodstains contaminated with soil when the DNA IQ™ extraction method is used.