DIRECT AMPLIFICATION OF BLOOD DEPOSITED ON SUBSTRATES COMMONLY ENCOUNTERED AT CRIME SCENES USING THE POWERPLEX® FUSION AND POWERPLEX® 18D SYSTEMS

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Items of evidence retrieved from crime scenes often contain blood. In order to generate short tandem repeat (STR) profiles from such evidence, extraction, purification and quantification prior to amplification of the DNA is necessary. In this research, autosomal STR profiles were generated via direct amplification of bloodstains which remained on the substrates.

Blood from two deceased males were collected three years prior to the initiation of this study and kept frozen until depositing them on 10 different substrates. These simulated crime scene objects included cigarette butt, drinking straw, dry brown leaf, woodchip, leather and five different types of fabrics often encountered as clothing items. None of these objects contained any lysing agent. A measured volume (0.1µL) of blood was deposited on these samples and dried for 24 hours at room temperature. Nine of these bloodstains were punched using a Harris 1.2 mm micro-punch. It was difficult to punch the woodchip therefore a minute piece, approximating 1.2 mm punch, was shaved off from this bloodstain. Each of these punched stains created from 0.1µL of blood from the two deceased individuals were amplified directly without any pretreatment. The substrates remained in the amplification reagents during the thermal cycling process. Each sample was amplified with the two direct autosomal STR amplification kits; PowerPlex® Fusion and PowerPlex® 18D Systems. Capillary electrophoresis was performed on a 3130xL Genetic Analyzer and data was analyzed using GeneMarker® software version 2.7.1 from SoftGenetics.

Complete and concordant autosomal STR profiles were successfully obtained from the bloodstains deposited on these 10 challenging objects when the body fluid was amplified directly using the PowerPlex® Fusion and PowerPlex® 18D Systems.