RECOVERABILITY OF FORENSIC DNA FROM COTTON SWABS IN THE PRESENCE OF DNAGARD™

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The biological samples recovered from crime scenes are often below the recommended thresholds in terms of quantity and quality for forensic DNA analysis, reducing the possibility to obtain discriminating genetic profiles. As a result, adequate transport and storage of DNA evidence are essential. Conventional cold methods can be non-practical and expensive for large quantities of samples, and potential equipment failures and temperature fluctuations during transportation are always a risk. As an alternative, DNAgard™ Tissues and Cells is a synthetic medium specifically formulated by Biomatrica Inc. for stabilizing and protecting unpurified genomic DNA at room temperature. This product is based on the principle of anhydrobiosis or "life without water", and is predicted to form a protecting thermo-stable barrier around DNA that dissolves upon rehydration, allowing samples to be easily used in downstream analyses without interference.

The use of DNAgard™ for forensic science applications, specifically adapting the product for the preservation of biological fluids on cotton swabs, is of interest. This work investigates whether consistent DNA yields are obtainable from mock stain swabs in the presence of DNAgard™ before evaluating the formulation for its efficacy to maintain the integrity of cellular material on swabs over time in a separate study. The yields of DNA extracts obtained from saliva and blood using two independent extraction/purification methods (i.e. organic phenol-chloroform and QIAamp® DNA Blood Mini Kit), were determined via real-time quantitative PCR (qPCR). This study shows that storage of liquid blood and saliva in microcentrifuge tubes with DNAgard™ results in consistent DNA yields for both extraction methods tested. However, organic extractions from cotton swabs displayed inefficient and inconsistent DNA yields; this low performance was especially evident for swabs containing blood. Our data shows that the phenol-chloroform extraction method in combination with cotton swabs as the substrate may not be appropriate for use with DNAgard™. ⌘