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COMPARISON OF FORENSIC DNA EXTRACTION METHODS

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Many different extraction protocols are being used in the forensic community. One critical factor in choosing an extraction procedure is the ability to minimize the amount of inhibition present in an extract. Organic extractions are well known for removing a majority of the inhibitors. However, an organic extraction is a long, manual process that is not automatable. Four different extractions were chosen, DNAIQ (Promega), ChargeSwitch (Invitrogen), Qiagen MiniPrep (Qiagen), and ForensicGem (ZyGem) in an effort to find an extraction procedure capable of being automated. Each extraction method had to have the ability of organic extractions to reduce the amount of inhibitors, while still obtaining a suitable quantity of DNA for STR analysis. To evaluate the efficiency of the procedures, both quantity and quality of DNA were compared. Initially, two magnetic bead systems, DNAIQ and ChargeSwitch, were run following the manufactures' protocol. Different fabric types with a variety of dilutions of blood were extracted. The quantitation results showed some evidence of inhibition. Modifications were made to each extraction protocol in an effort to optimize the extraction method. The second round of extractions was performed with a subset of the samples. The results showed reduction in inhibition, while increasing the amount of DNA isolated. Subsequently, all five extraction methods were evaluated using challenging fabrics with blood, touched items, buccal swabs, hairs, and cigarette butts. This poster will show which extraction was chosen for use in our laboratory. The protocol was chosen based on the quality of data compared to the organic extraction method currently being used in our laboratory.