OPTIMIZATION OF AUTOMATED DNA EXTRACTION
FROM COMPROMISED TISSUES WITH DNA IQ™

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The DNA IQ™ System (Promega) was employed for high throughput DNA extraction of human muscle and soft tissue recovered from the World Trade Center and American Airlines flight 587 disasters. The initial validation, with tissue recovered within a week of the incident, yielded good results. However, less than 15% of the subsequent samples produced STR profiles. These samples were more compromised, specifically contaminated with bacterial DNA. Moreover, the human DNA was no longer of high molecular weight. The DNA IQ™ paramagnetic resin captures a consistent amount of DNA. This property presents an obstacle for bacterially contaminated samples since saturation by bacterial DNA binding could occur prior to sufficient human DNA binding. Based on suggestions from Allan Tereba (Promega), we therefore modified the method to increase the DNA yield and success rate**.**

 Specifically, we improved the extraction buffer, reduced the sample size, increased the amount of resin, and consequently the amount of lysis buffer, and adjusted the resin resuspension conditions for an automated system. Adding more resin directly enhanced the total binding capacity and alleviated the suspected bacterial contamination problem. This optimized method was compared to the QIAamp DNA extraction (Qiagen) for 323 samples. Equal results for both systems occurred with 196 (61%) samples. However, the Qiagen extracts produced more loci for 48 (15%) samples, whereas DNA IQ™ extracts generated more loci for 79 (24%) samples.