A COMPARATIVE STUDY OF THE DNA IQ™ EXTRACTION PROTOCOLS AND THE ORGANIC EXTRACTION PROTOCOL IN CASEWORK SAMPLES: II

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The extraction of quality DNA from biological substances is an important step in forensic DNA testing. Presently, the majority of forensic laboratories use a lengthy and potentially hazardous organic extraction protocol involving Chelex and/or phenol:chloroform:isoamyl alcohol. DNA Isolation and Quantitation™ (DNA IQ™), produced by the Promega Corporation, is a new DNA extraction method that is faster and safer to use. This study is a continuation of the work previously performed in this laboratory involving DNA IQ™ and its use in blood and saliva DNA extractions. The DNA IQ™ Small Casework Protocol and the organic extraction protocol (phenol:chloroform:isoamyl alcohol) were used to extract DNA from various casework samples, such as cigarette butts, envelope flaps, chewing gum, and chewing tobacco. The quantity and quality of the DNA obtained were compared.

DNA obtained from envelope flaps, gum, and chewing tobacco using the DNA IQ™ Small Casework Protocol was comparable to DNA obtained using the organic extraction protocol in both quantity and quality. Extraction of DNA from cigarette butts using the DNA IQ™ Small Casework Protocol yielded little to no DNA, presumably due to the solidification of the filter components at high temperatures. However, by applying variations of the incubation conditions recommended for tissue and hair extraction, DNA can be obtained, albeit at lower levels than the organic extraction protocol. Further work is being done to optimize this protocol for use in our laboratory.

The DNA isolated from the samples mentioned above and from samples previously examined in our laboratory using the DNA IQ™ system, has been shown to be adequate for the purpose of forensic DNA analysis. This, in addition to the faster extraction time and the elimination of hazardous reagents, makes the DNA IQ™ system preferable to the currently used organic extraction protocol. Initial extraction studies of semen and various other challenging samples (using the DNA IQ™ Small Casework Protocol) and hair (using the Tissue and Hair Extraction Kit for use with DNA IQ™ Protocol) are promising and additional work is currently in process.