UTILITY OF THE MAXWELL® 16 AND THE DNA IQ™ REFERENCE SAMPLE KIT FOR THE PURIFICATION OF DNA FROM BONE SAMPLES

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The extraction and purification of DNA from skeletal remains is often essential for the identification of unknown decedents. Methods used to obtain useable DNA from bone samples typically include procedures for the removal of calcium and phosphate from the bone matrix (demineralization), inactivation of nucleases, and the removal of Polymerase Chain Reaction (PCR) inhibitors. These procedures are often time consuming, laborious, and often require numerous manipulations which could potentially lead to DNA sample loss. The choice of demineralization reagents, lysis buffer, incubation times and temperature, as well the DNA purification process all play a critical role in the efficiency of DNA recovery from bone samples.

Promega Corporation (Madison, WI) has developed the Maxwell® 16 automated instrument for use with the DNA IQ™ Reference Sample Kit for the purification of DNA from a variety of forensic samples. The Maxwell® 16 was evaluated for the isolation of DNA from bone samples using two different front end demineralization/lysis procedures. The first protocol used the demineralization procedure developed by the Armed Forces DNA Identification Lab (AFDIL) which included a 24 hour incubation with 1% Sodium N-Laurylsarcosinate, 0.5 M EDTA, and Proteinase K (20mg/ml). The second protocol included an initial 1 hour incubation with a Bone Incubation Buffer (Promega Corporation) and Proteinase K (18mg/ml). The incubation times were varied with each protocol to assess the effect on DNA recovery. Purification of all samples was completed on the automated Maxwell® 16 Instrument with the DNA IQ™ Reference Sample Kit.

Consistent STR profiles were obtained using the Promega Bone Incubation Buffer regardless of the incubation time. The AFDIL demineralization procedure initially failed to produce STR profiles with the Maxwell® 16. These results may be due to a pH incompatibility of this demineralization solution with the DNA IQ™ buffer and reagent systems. Alterations to the demineralization buffers are being evaluated to further enhance compatibility and DNA recovery.