

## LOW QUANTITY DNA EXTRACTION FROM FIRED CARTRIDGE CASINGS: PROTOCOL DEVELOPMENT AND CASEWORK EXPERIENCE

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Recent studies have shown that modifications to PCR amplification procedures have enhanced the ability of laboratories to obtain DNA results from contact surface areas on many items. The method of cellular recovery most often used involves swabbing the surface of a handled item and extracting the DNA directly from the swab.

This research investigated the use of sonication as a method of removing cellular material from solid materials such as fired cartridge casings and live ammunition. Potentially deleterious effects on cells and DNA were considered a potential drawback for this method. Vaginal swabs were sonicated for 10, 20 and 30 minute periods in 1X PBS and produced high yields of intact epithelial cells observed microscopically. Likewise, control DNA samples were sonicated for 10, 20 and 30 minute periods which produced no negative impact on subsequent amplification of the DNA.

This protocol employs sonication as the method to maximize recovery of cellular material potentially adherent to both fired cartridge casings and live ammunition. A fired cartridge casing was partially submerged in 1X PBS in a screw-cap vial. The vial was sonicated for 20 minutes and then the cartridge casing was removed. The remaining liquid was transferred to a 1.5ml tube and centrifuged to sediment cellular material. The supernatant was removed and discarded leaving a pellet that was retained in the tube. The pellet was then digested following standard protocols.

Amplification was conducted using AmpFISTR PCR amplification kits. Amplified product was concentrated in a Microcon 30 and run on an ABI Prism 377. DNA results that were obtained by use of these procedures have provided useful information in the investigation of five homicides. DNA profiles obtained from fired 9mm cartridge casings were sufficient to exclude more than 20 individuals in an ongoing homicide investigation while simultaneously providing a link between that crime and two other violent felonies. In a separate incident, an inclusion was reported from a DNA profile obtained from a live 12 gauge shot shell discarded following a homicide.