

EXTRACTING AND PURIFYING DNA FROM CHALLENGING CALCIFIED AND ADHESIVE-BASED SAMPLES IN PARALLEL USING A WALKAWAY ROBOTIC SYSTEM

Matthew Ludeman, Angela Chen, William Hutchens, Ellen Crone, Julio Mulero, [Kevin W.P. Miller](#)
Hamilton Company

Calcified samples or those that include an adhesive substrate may require more robust processing compared to routine forensic sample types. When performed manually, DNA extraction and purification of these challenging samples can impede overall laboratory efficiency and invite risks of human error and variability. A novel combination of assay chemistry and robotic workstation aid robust, repeatable, and hands-free DNA extraction and purification of even the most challenging sample to ensure high yields of pure DNA for downstream analyses such as capillary electrophoresis or massively parallel sequencing. At the same time, it facilitates high-throughput and parallel processing, up to 96 batched samples in volumes ranging from 50 – 5000 μL , to enhance productivity in the lab. The assay kit uses uniquely structured magnetic particles and a multi-component surface chemistry. The hands-free automated workstation is pre-programmed with the assay protocol, and contains all tools necessary for the workflow, including a deck-mounted purification system that moves the secure sample-bound particles rather than liquids. We demonstrate utility of this automated DNA extraction and purification workflow during typical validation studies using a variety of common human identification (HID) sample types and concentrations. Robust and reliable DNA yields are a strong indication that the combination of assay chemistry, specialized technology, and automated workstation are especially useful for rapid, hands-free extraction of challenging evidentiary samples.