

AutoMate *Express*™ Forensic DNA Extraction System

- Designed to improve the yield, reproducibility, and overall purity of DNA isolated from both routine and challenging forensic samples
- Enables recovery of high-quality DNA, free of PCR inhibitors and suitable for downstream applications such as quantitative real-time PCR and short tandem repeat (STR) analysis
- Simple and fast separation of substrate from lysate with the unique PrepFiler LySep™ Column
- Quick and easy run setup with ready-to-use prefilled cartridges
- Closed system that minimizes the risk of contamination and transposition errors
- Processes 1 to 13 samples in a single run
- Rapid implementation with prevalidated, preprogrammed instrument protocols
- Integrated solution including novel reagents, consumables, and automation to provide time-saving, cost-effective, and reliable DNA extraction
- Improves downstream genotyping (STR) success rate and profile quality



Introduction

The quantity and quality of genomic DNA extracted from a forensic sample can greatly impact the success of the downstream analysis and the overall quality of the final result. Forensic samples are among the most difficult specimens to process because they are often limited in quantity, may be environmentally exposed, and may require purification from difficult substrates containing PCR inhibitors. For laboratories looking to achieve better STR profile results, improve overall efficiency, and streamline the analysis process, maximizing the performance of the extraction method is one of the most effective ways to achieve these goals.

The AutoMate *Express*™ Forensic DNA

Extraction System is an easy-to-use, robust benchtop instrument that utilizes the PrepFiler *Express*™ and PrepFiler *Express* BTA™ (bone, tooth and adhesive) chemistries packaged in prefilled, foil-sealed cartridges. Life Technologies has designed the PrepFiler™ kits specifically to improve the quantity and quality of DNA isolated from forensic samples, thereby increasing the potential to obtain maximum information from downstream STR analysis.

Streamlined Off-Line Lysis

The PrepFiler *Express*™ Kits include the innovative PrepFiler LySep™ Column, which dramatically streamlines the off-line lysis portion of the extraction method. PrepFiler™ Lysis Buffer or PrepFiler BTA™ Lysis Buffer is added

directly into the PrepFiler LySep™ Column along with the sample for incubation. Next, the PrepFiler LySep™ Column is centrifuged at high speed, which permits lysate to flow through the proprietary burstable membrane while the substrate remains behind in the column. The sample tube is then loaded directly on the AutoMate Express™ instrument. This eliminates the manual lysate and substrate transfer steps, saving time and minimizing cross-contamination and sample transposition events.

The AutoMate Express™ system also provides significantly shorter off-line lysis protocols for certain challenging sample types such as hair and bone. These sample types typically require from eight hours to several days to complete off-line lysis with other commonly used methods. The AutoMate Express™ protocols enable completion of off-line lysis in approximately 40 minutes for hair and two hours for bone.



Figure 1. PrepFiler LySep™ Column

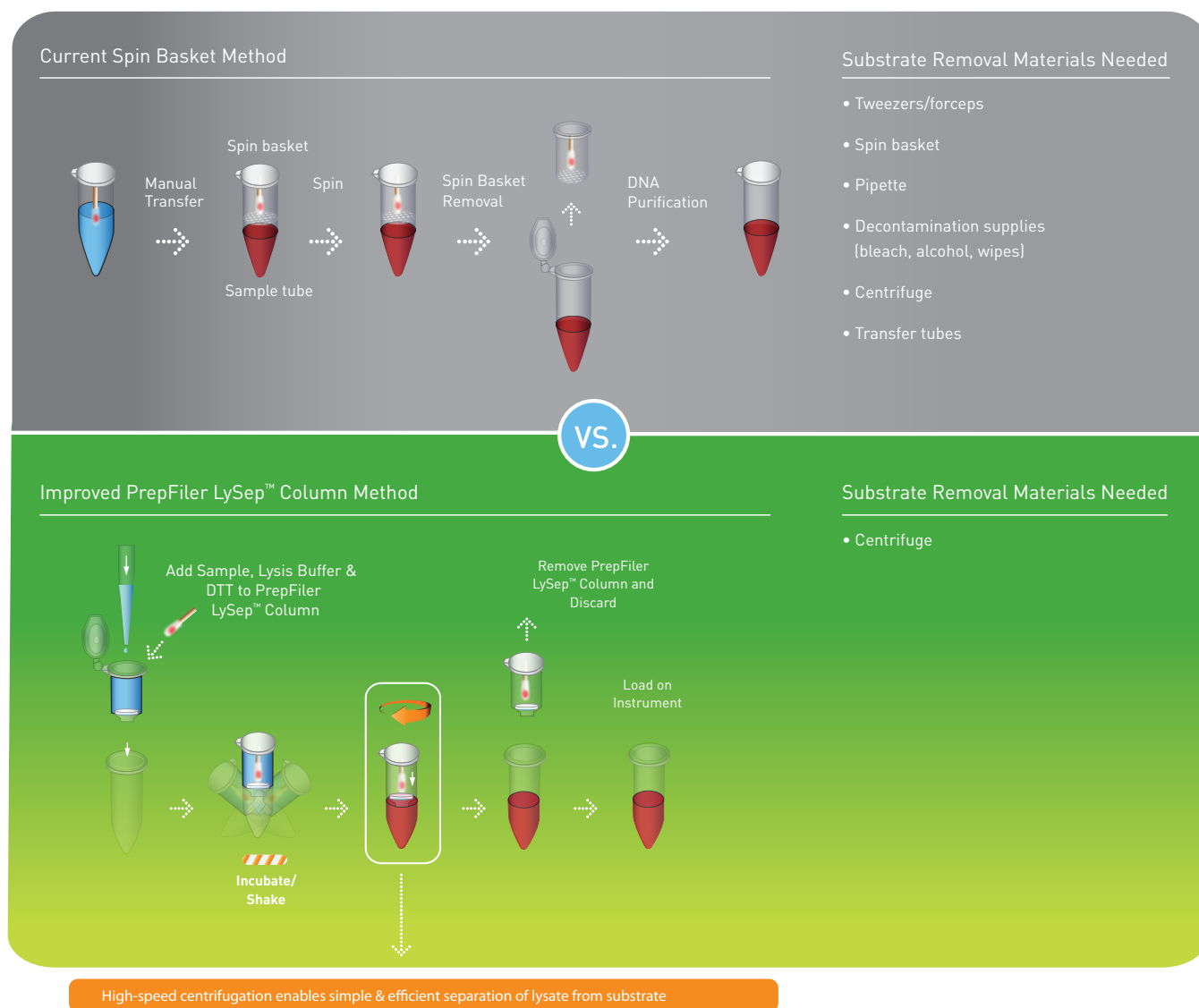


Figure 2. Comparison of off-line lysis workflows. (Top) Commonly used spin basket workflow. Transfer of substrate to spin basket requires the use of sterile tweezers or other tools that must be thoroughly cleaned between uses. The tube must be opened several times during substrate placement in the spin column and spin column removal, increasing the potential risk for cross-contamination. An extra centrifugation step may be required followed by transfer of the sample lysate to a new tube. Residual substrate can influence the proper isolation of the DNA if loaded directly on an instrument or processed manually. (Bottom) The new PrepFiler LySep™ Column allows users to easily perform lysis and effective substrate removal in a single tube assembly. There is no transfer of the substrate to another tube for removal thus minimizing hands on time and reducing the risk of cross contamination and sample transposition events. The only analyst interaction and handling of the substrate is during the addition of the substrate into the PrepFiler LySep™ Column for lysis.

Walk-away AutoMation

The PrepFiler Express™ and PrepFiler Express BTA™ Kits provide all the reagents and accessories needed to perform DNA isolation on the AutoMate Express™ instrument*. The AutoMate Express™ instrument performs all DNA isolation steps automatically after selection of one of two protocols from the instrument keypad. No separate computer is required to operate the instrument. Both protocols come pre-programmed on a single AutoMate Express™ instrument protocol card. Once the extraction method is complete, samples are eluted into easy to handle snap cap tubes which are compatible with downstream qPCR/PCR setup on the HID EVolution platform.

Designed to Improve DNA Yield and Profile Quality

The PrepFiler Express™ kits use a combination of uniquely structured magnetic particles and a multi-component surface chemistry optimized to maximize performance at each step in the extraction workflow. This enables extremely efficient DNA binding capacity and high recovery of DNA concentrated in a small volume, making it suitable even for samples with minimal input.

As part of the validation process Life Technologies tested the performance of the

Blood Sample Volume (μL)	Average DNA Yield, ng (n=4)
5	144.89
1	26.03
0.25	6.39
0.1	2.68
0.025	0.65
XB	0.00

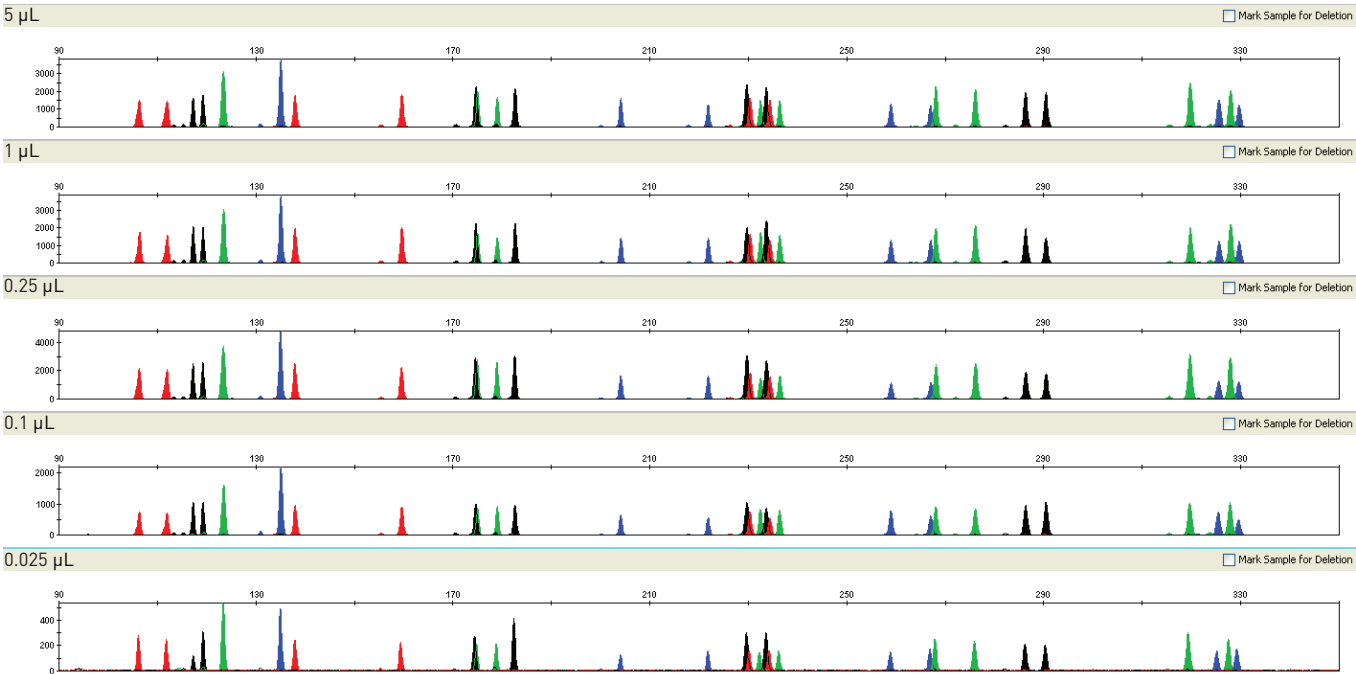
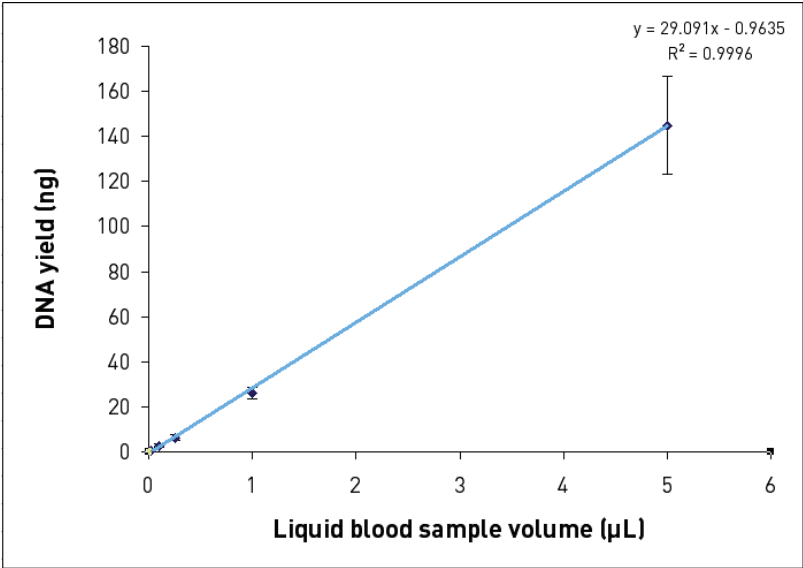


Figure 3. SWGDAM sensitivity study data displaying the yield obtained from a dilution series ranging from 0.025 μL to 5 μL of blood. The average DNA yield from four replicate extractions is displayed in the top panel for each of the five blood samples and an extraction blank (XB). The blood series was also plotted on a graph to determine the linearity of the DNA recovery in the middle panel, which demonstrates a proportional increase in DNA yield as a function of blood input. In addition, full, balanced STR profiles were obtained from each sample, as shown in the bottom panel.

PrepFiler *Express*™ kits against other commercially available automated solutions on a variety of forensic-type samples. The extracts were evaluated for DNA concentration and total quantity of DNA isolated using the Quantifiler® Duo DNA Quantification Kit, as well as STR profile quality using the AmpFℓSTR® Identifier® PCR Amplification Kit (results shown in figures 3-6).

In most cases, the AutoMate *Express*™ system running PrepFiler *Express*™ kits matched or exceeded the concentration and total yield of DNA produced by other methods, and for certain sample types, the STR profiles exhibited higher quality profiles with less allelic drop-out.

Increasing the yield and purity of DNA increases the likelihood of obtaining high quality DNA profiling results on the first attempt and enables more options in terms of the types and numbers of analyses that can be performed on each sample.

Effective Removal of PCR Inhibitors

The PrepFiler *Express*™ kit uses a specially formulated wash solution developed to maximize the removal of common PCR inhibitors found in forensic samples while minimizing any loss of DNA during the wash steps. This enables clean, balanced DNA profiles to be generated that are easy to interpret.

Improved Downstream Performance

Selecting an extraction method is one of the most important decisions a laboratory will make. The success of the extraction technique is pivotal in establishing a solid foundation for the rest of the workflow. The AutoMate *Express*™ system has been designed to satisfy the key requirements of a forensic DNA extraction method: flexibility of input sample type and delivery of high quantity and quality DNA on an easy-to-use and robust platform. DNA extracted on the AutoMate *Express*™ system will allow for increased data quality for a wide range of samples and facilitate improved downstream performance in the forensic sample analysis workflow.

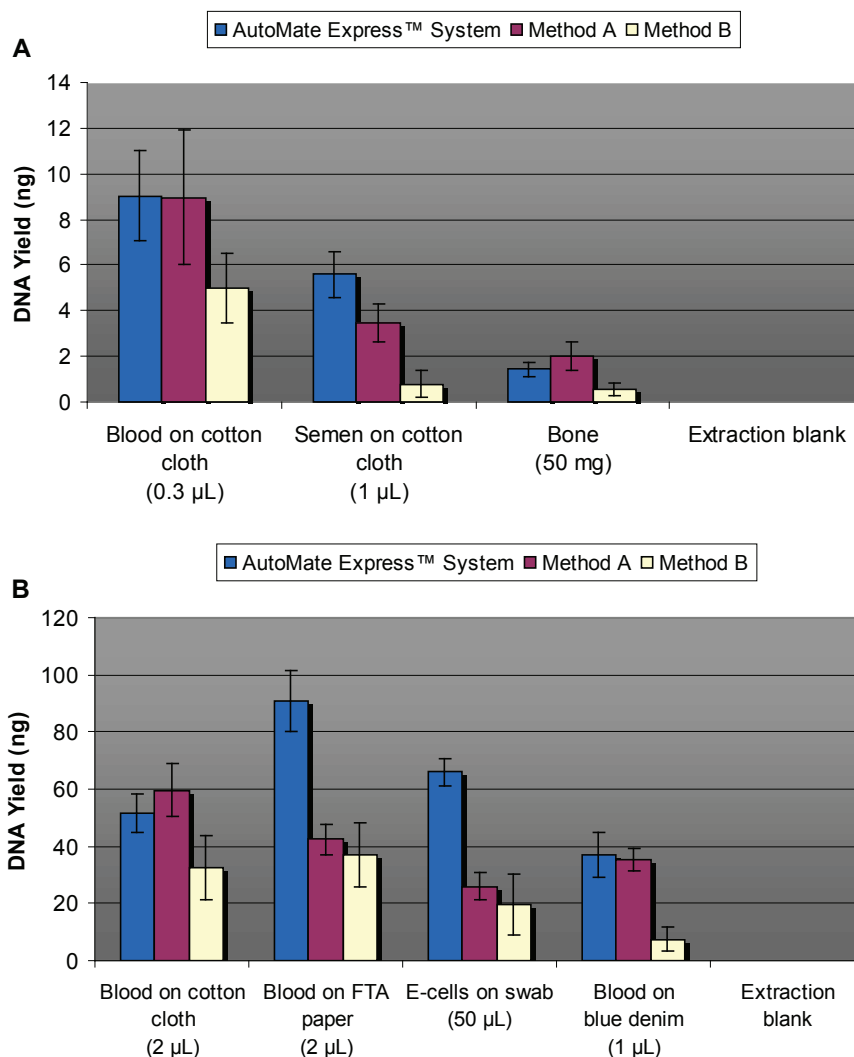


Figure 4. Correlation study results comparing the AutoMate *Express*™ System with two other benchtop automated extraction systems (Method A and B). Yield obtained from the lower input sample types (Panel A) and higher input samples (Panel B) indicate equal or better DNA recovery when compared to other systems. Each of the sample types listed above were extracted 12 times each with the exception of the bone sample which was extracted six times.

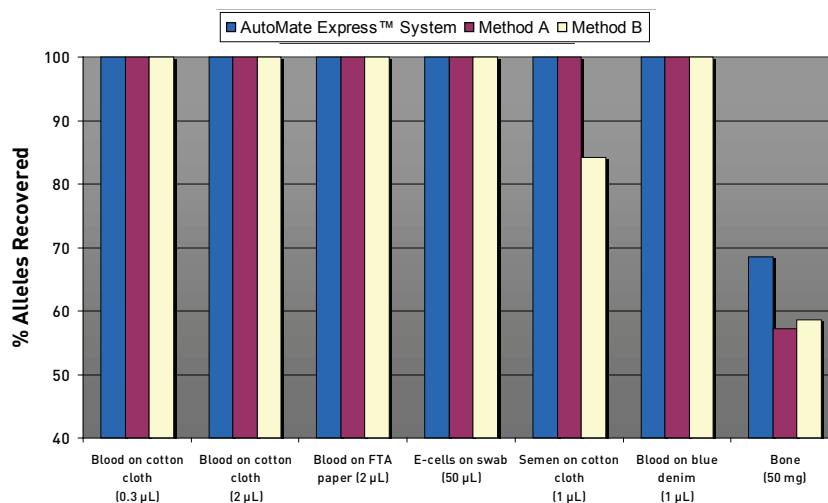


Figure 5. Correlation study results showing the percent allele recovery using the AmpFℓSTR® Identifier® PCR Amplification Kit. The AutoMate *Express*™ system matched or exceeded the total percentage of alleles recovered for each sample type when compared to two other benchtop automated extraction systems (Method A and B).

PrepFiler Express™ Kit Format and Components

The AutoMate Express™ system utilizes two different configurations of PrepFiler™ chemistry. The PrepFiler Express™ Forensic DNA Extraction Kit is suitable for the majority of common sample types encountered in forensic laboratories such as bodily fluids on different substrates including FTA paper, cotton swabs, cotton cloth, denim and many others. The PrepFiler Express BTA™ Forensic DNA Extraction Kit was designed specifically for challenging samples such as bones, teeth and adhesive based samples including cigarette butts and tape lifts. Both formats come with all the reagents and plastic components including the PrepFiler LySep™ Columns needed to perform 52 DNA extractions on the AutoMate Express™ Instrument*. Plastics-only kits are also available in the 2 formats including 52 sets of all the necessary plastic components.

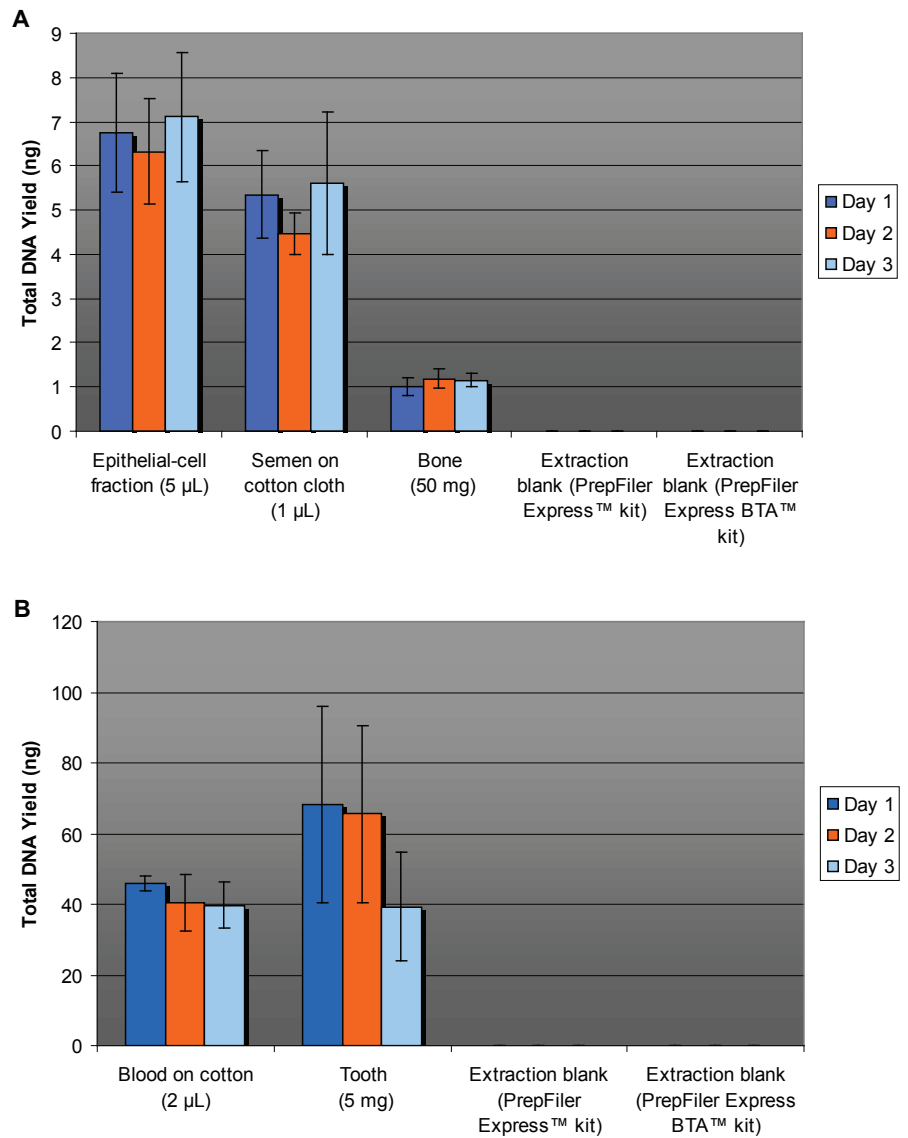


Figure 6. SWGDAM reproducibility study results. Each sample type was extracted using the AutoMate Express™ system four times on three separate days. The results generated with the Quantifiler® Duo kit suggest consistent recovery for the sample types across each of the three days with IPC C_T values indicating effective inhibitor removal. Panel A displays the lower input samples with Panel B showing higher input samples.

* Dithiothreitol (DTT) is not included as it requires frozen storage or fresh preparation prior to each use.

KIT COMPONENTS

PrepFiler Express™ Forensic DNA Extraction Kit

Components	Description
PrepFiler™ Lysis Buffer	1 bottle, 27 ml
PrepFiler Express™ Cartridges	52 cartridges
PrepFiler LySep™ Columns*	52 columns
PrepFiler™ Sample Tubes*	52 tubes
PrepFiler™ Elution Tubes*	52 tubes
AutoMate Express™ Tips and Tip Holders*	52 tips in sheaths

PrepFiler Express BTA™ Forensic DNA Extraction Kit

Components	Description
PrepFiler BTA™ Lysis Buffer	1 bottle, 13 ml
PrepFiler Express™ Cartridges	52 cartridges
Proteinase K	1 tube, 400 ul
PrepFiler LySep™ Columns**	52 columns
PrepFiler™ Sample Tubes**	52 tubes
PrepFiler™ Elution Tubes**	52 tubes
PrepFiler™ Bone and Tooth Lysate Tubes**	52 tubes and 52 caps
AutoMate Express™ Tips and Tip Holders**	52 tips in sheaths

* Included in the PrepFiler Express™ Plastics Kit

** Included in the PrepFiler Express BTA™ Plastics Kit

ORDERING INFORMATION

Description	P/N
AutoMate Express™ Forensic DNA Extraction System	4441763
AutoMate Express™ Forensic DNA Extraction System with Service Install	4456582
PrepFiler Express/AutoMate Express™ Validation	TRN00151
PrepFiler Express/AutoMate Express™ Performance Check	TRN00175
PrepFiler Express™ Forensic DNA Extraction Kit	4441352
PrepFiler Express™ Plastics Kit	4442706
PrepFiler Express BTA™ Forensic DNA Extraction Kit	4441351
PrepFiler Express BTA™ Plastics Kit	4442707

Related Products

Eppendorf Thermomixer w/Block	022670000
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