

VALIDATION OF PREPFILER™ FORENSIC DNA EXTRACTION KIT FOR EXTRACTION OF GENOMIC DNA FROM FORENSIC SAMPLES

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Isolation of DNA from forensic samples is a challenging process. This is due to large variation in sample types, possible exposure of the samples to environmental insults, presence of PCR inhibitors and limited starting material. It is desirable to have an extraction methodology that enables the isolation of DNA from samples that contain small quantities of biological material, obtaining the DNA at a high concentration so that the volume of extract used for PCR is minimal, removal of PCR inhibitors or substances that interfere with the PCR, the extraction of DNA from a variety of biological samples, and the extraction reagents and protocol are amenable to automation.

PrepFiler™ Forensic DNA extraction Kit is developed for isolation of high quality genomic DNA from a wide variety of biological samples. The kit enables lysis of various sample types, binding of DNA to the magnetic particles with unique surface chemistry, removal of PCR inhibitors and high recovery of DNA particularly from samples that contain low quantities of DNA. The process for extraction of DNA was optimized using multifactor variant analysis and guard band studies. The newly designed magnetic particles have high capacity for DNA binding and samples containing low and high amounts of biological material can be processed effectively. Performance of the developed method for extraction of DNA was compared to traditional phenol/chloroform method and some commercially available kits. Sample types investigated include liquid blood, blood stains on denim, cotton fabric and FTA paper, buccal swabs, liquid saliva, saliva stains on fabric, semen stains on cotton fabric, samples exposed to environmental insults, samples spiked with PCR inhibitors, cigarette butts and touch evidence type samples. DNA yields for all sample types tested were equal to or better than both phenol/chloroform extraction method and commercial kits tested, especially for lower input amounts. Purified DNA was free of PCR inhibitors. Quality of the DNA extract was evaluated for down stream applications such as real time PCR and STR profiling. Profiles obtained from compromised samples were complete, conclusive, and devoid of PCR artifacts. The scripts for automation of the PrepFiler™ Forensic DNA extraction Kit on Tecan EVO® 150 robot are developed.

The results from validation studies performed following the revised validation guidelines provided by the Scientific Working Group on DNA Analysis Methods (SWGDM) will be presented.