

# Validation of RapidHIT™ ID as New Approach to DNA Profiling for Forensic Investigation of Different Sample Matrixes

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## INTRODUCTION

RapidHIT™ ID is an automated sample-to-profile system, which allows extraction, amplification and short tandem repeat (STR) profiling via capillary electrophoresis to be done in one platform. This novel approach allows a laboratory to get a full DNA profile of 21 STR loci from a cut / swab evidence sample. The chemistry used is RapidINTEL sample cartridge based on GlobalFiler Express chemistry which is easy-to-use sample cartridges that has all necessary reagents for sample preparation and amplification. The protocol itself needs one minute of hands-on time, which then leads to lab-quality forensic DNA profile information within two hours. The software (GeneMarker HID) automatically analyses the data created during the run and generates the DNA profile information.

For end users in law enforcement, forensics and government agencies, the RapidHIT ID system is designed for easy and fast generation of DNA profiles for STR-based human identification. Data on species specificity, sensitivity and PCR-based studies will be presented along with data to address some of the unique aspects of validating an integrated sample-to-answer system.

## SAMPLE PREPARATION

Types of sample	Sample Preparation
Swab	Stained with 0.2, 0.5, 1.0, 2.0 and 4.0 µl of blood
Cotton substrate	Cut stain (3mm x 3mm) from item and stained with 0.2, 0.5, 1.0, 2.0 and 4.0 µl of blood
Denim substrate	Cut stain (3mm x 3mm) from item and stained with 0.2, 0.5, 1.0, 2.0 and 4.0 µl of blood

\*All stains were allowed to dry before loading into the sample cartridge.

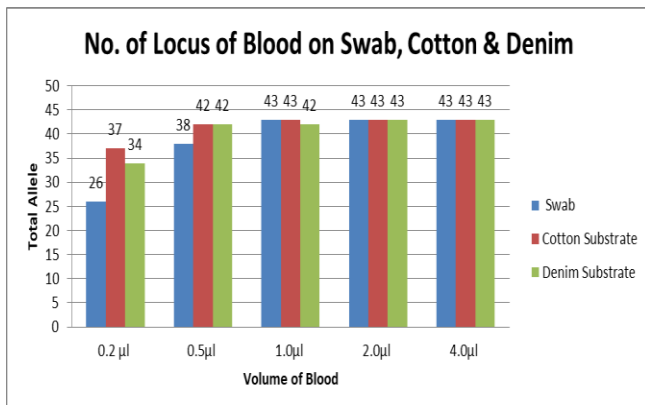


Figure 1: No. of Locus of Blood on Swab, Cotton & Denim



Figure 2: RapidHIT ID



Figure 3: RapidHIT ID Sample Cartridge

## Results and Discussions

- Based on this study, it shows that by adding more blood volume to matrices will produce higher peak and more possibility on getting full profile.
- Blood on cotton substrate was proven to be obtained highest sensitivity compare to blood on swab and denim substrate with equal blood volumes due to composition of matrix in which cells from blood on cotton substrate were easily detached than blood on swab and denim substrate.
- However, DNA concentration more important as it would give amount of DNA present regardless of volume being used.

## Summary of results from various types of samples tested

Types of samples	No. of loci
Swab of blood	Full DNA profile for 1.0 µL and above
Cut stain of blood on cotton substrate	Full DNA profile for 1.0 µL and above
Cut stain of blood on denim substrate	Full DNA profile for 2.0 µL and above

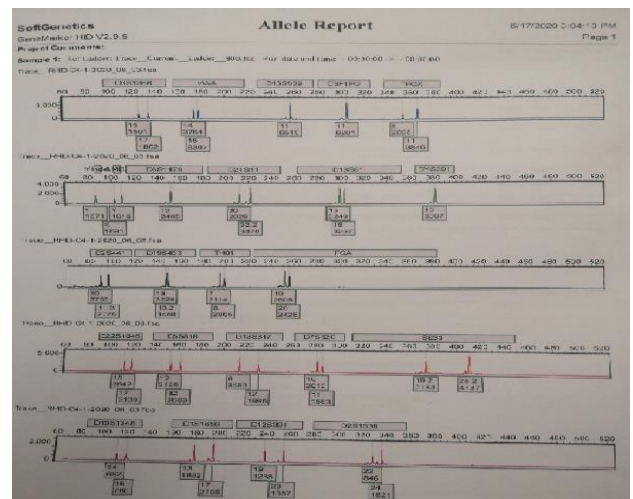


Figure 4: Representative electropherogram of DNA sample after analysing using RapidHIT ID