

DNA extraction and STR profiling using leftover material from an immunochromatographic strip assay

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Introduction

Body fluid identification is a substantial part of forensic trace analyses. However, DNA evidence is generally limited and often further reduced by presumptive and confirmatory tests (Fig.1). This study investigated the potential of using leftover material from an immunochromatographic strip test assay for DNA extraction and STR profiling. A protocol for DNA extraction and profiling from such tests was developed.

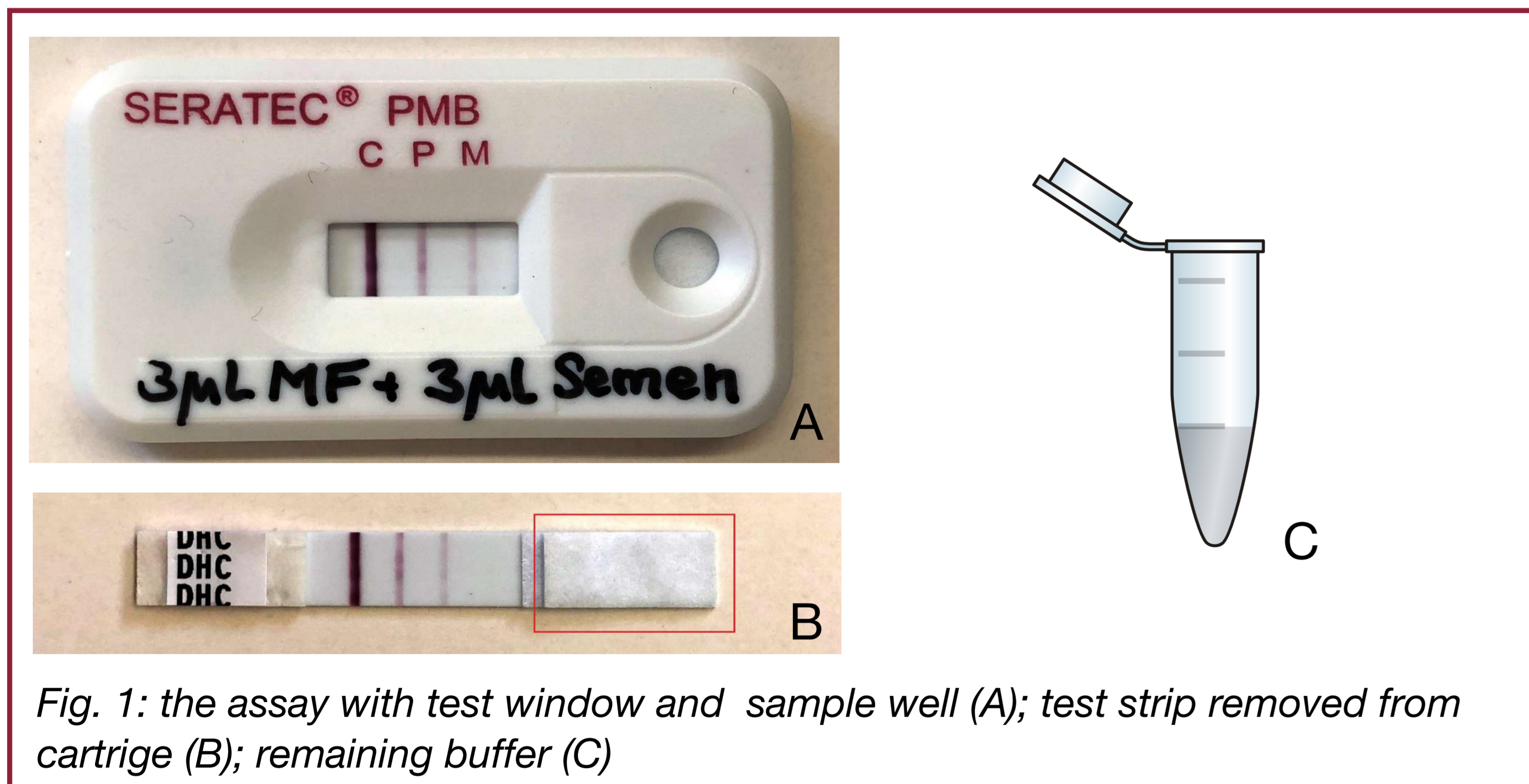


Fig. 1: the assay with test window and sample well (A); test strip removed from cartridge (B); remaining buffer (C)

Results and discussion

DNA extraction was successful. The remaining sample-buffer solution will be the more convenient source for DNA extraction. 100 µL should be used for extraction. If the sample-buffer solution was completely used on the test strip, apply the following: Carefully remove the test strip from the cartridge. Cut 1 cm of the sample pad and transfer it to a reaction tube for extraction.



Experimental set-up

For the study the SERATEC® PMB Test was used. This duplex strip test assay simultaneously detects two proteins, human hemoglobin and D-dimer. The latter is found to be a reliable marker of menstrual blood (Holtkötter et al., 2017), hence the test assay is able to differentiate between menstrual and non-menstrual blood. Body fluid samples and mixtures were extracted using the kit's extraction buffer and applied to the test pad according to manufacturer's recommendations. For STR profiling, two different sources of DNA were investigated (Fig. 1).

In this study, DNA was extracted using Promega's Maxwell® Instrument and amplified using the PowerPlex® ESX 17 Pro.

DNA profiling was performed using Thermo Fisher Scientific's 3130 Genetic Analyzer with the GeneMapper® ID software.

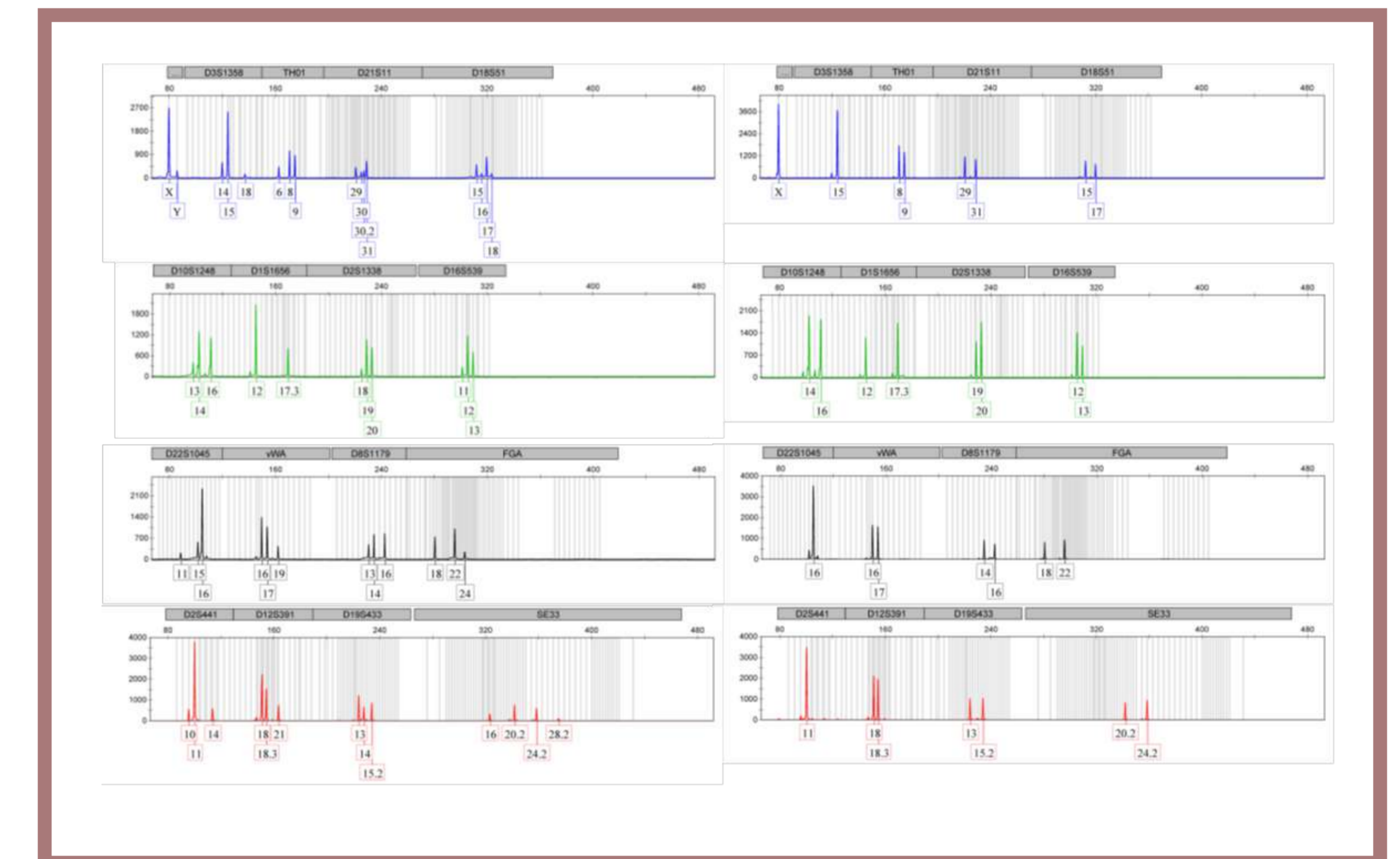
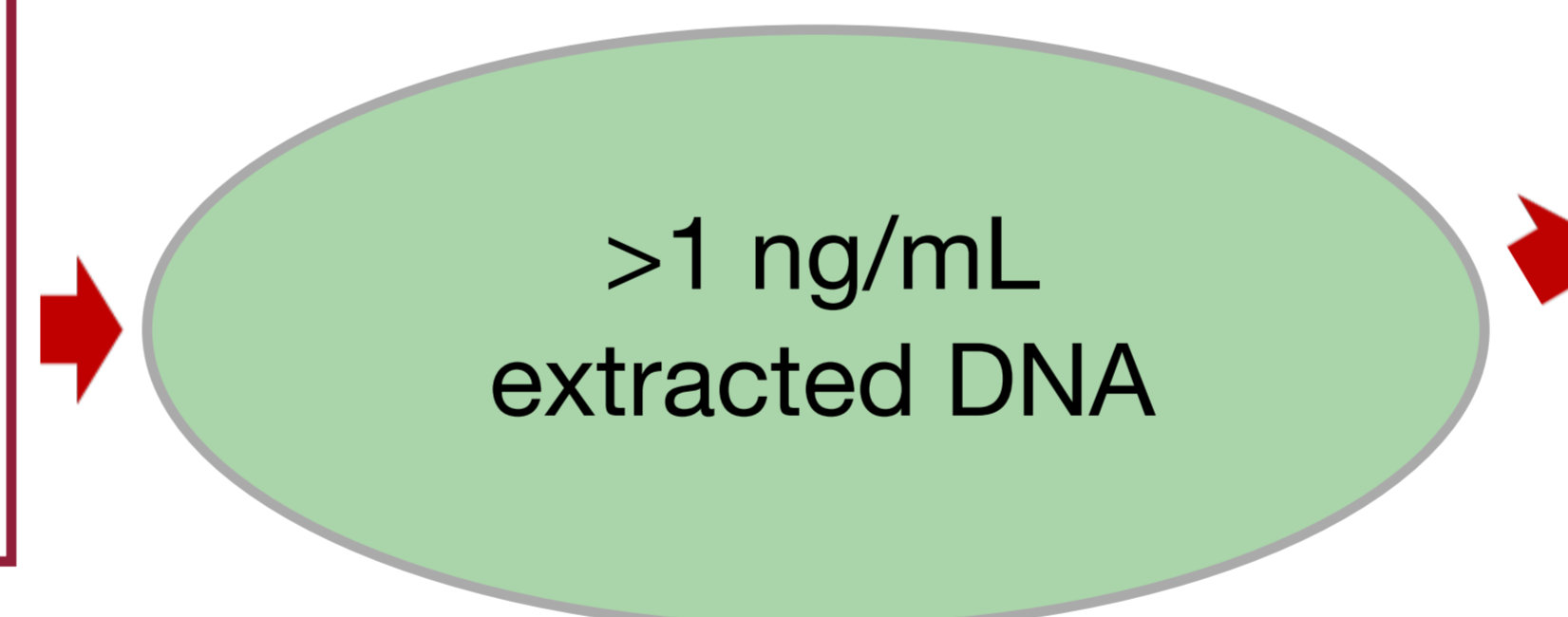


Fig. 2: high quality STR profiles generated from the sample pad; mixture of menstrual fluid and semen (left); pure menstrual fluid (right)

Conclusion

STR profiling produced complete, high quality DNA profiles (Fig.2), and no significant differences in peak height or quality of the profiles were observed between the two collection methods. The results of this study show that DNA extraction and profiling using leftover material from immunochromatographic strip test assays is an innovative solution to limit sample waste from valuable evidence.