

FROM BODY FLUID DETECTION TO DNA PROFILING: GET THE MOST FROM A SAMPLE

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Work Aim

The present work assessed DNA isolation and characterization after body fluid identification from Lateral Flow Immunochromatography (LFI). The DNA from LFI test membranes and LFI buffer was extracted applying different methods independently by four different laboratories (L1-L4 in Table 1).

Materials and Methods

SERATEC® LFI tests were used for body fluid detection of saliva, blood, menstrual blood, and semen via protein markers. The experimental conditions included the deposition of these body fluids on different types of textile; direct body fluid testing; as well as fluid mixtures. DNA isolation was performed from the SERATEC® test membrane (SM) and/or SERATEC® extraction buffer (SEB).



1. Plastic card (bottom part)
2. Sample pad
3. Strip membrane
4. Result line
5. Control line

Fig. 1. SERATEC® test strip inside an open test card after reaction. An extract was placed on the sample pad and flowed along the test membrane. Both test result line and control line are clearly visible.

Results

All four laboratories were able to successfully isolate genomic DNA. Identifiable DNA profiles from membranes and/or sample extraction buffer were generated, Y chromosome was characterized (Table 1).

	Body fluid	Sample origin	Time since deposition	LFI source of DNA	Kits used for DNA extraction	PCR / Y-Chr.	DNA profiles
L1	saliva	different textiles	24 hours till 6 months	SEB, SM	DNeasy® Blood and Tissue Kit (Qiagen)		+
L2	menstrual blood, mixtures	liquid, pads, cotton	>24h –months	SEB, SM	Maxwell® (Promega)		+
L3	saliva, semen	liquid	>24h	SM	ForensicGEM (MicroGEM), Organic extraction, Monarch® Nucleic Acid Purification kit (New England Biolabs) QIAamp® (Qiagen)	+	+
L4	semen, blood, saliva	liquid	>24h	SEB, SM	PrepFiler™ Forensic DNA Extraction Kit (ThermoFisher)	+	

Table 1. DNA extraction and characterization results post body fluid screening

Conclusion

Components of LFI kits, particularly, LFI test membrane and extraction buffer, are applicable sources of DNA and should not be neglected as such. Various DNA extraction techniques can be applied to maximize the yield from samples that were supposedly consumed for body fluid screening.

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