

Assessment of body fluid identification over time

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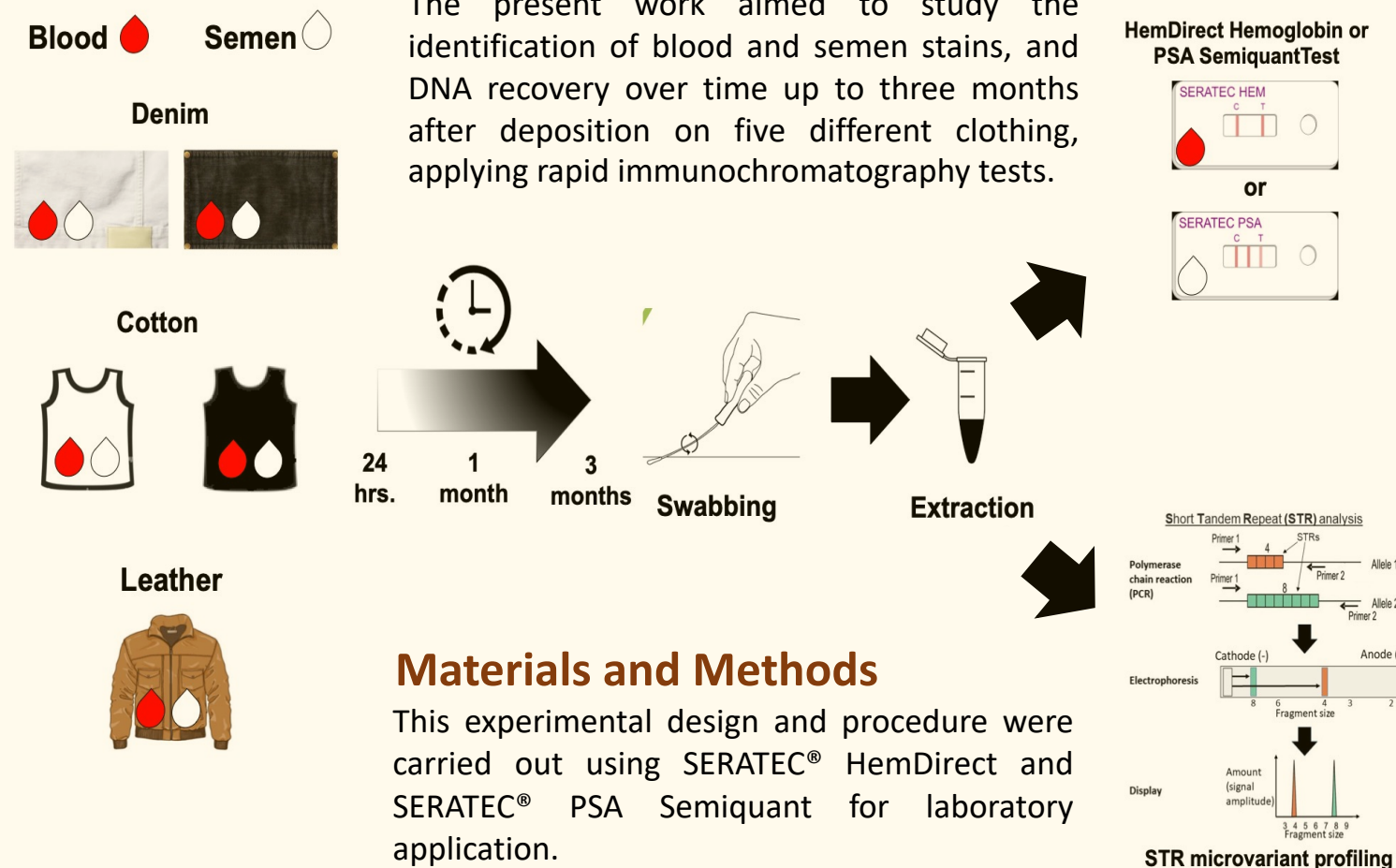
Introduction

Body fluid identification at the crime scene has important repercussions on criminal investigations to characterize potential biological evidence as well as to determine the presence of someone at the place. Nowadays, methods for body fluid identification rely on chemical, enzymatic and/or serological assays. Serological assays are specific towards the body fluid identification as they are based on antigen-antibody reactions binding unique or almost unique proteins for different body fluids such as peripheral and menstrual blood, semen, and saliva. Despite of the widespread use of serological tests, there are few studies assessing the impact time on body fluid identification. The present work assessed the effect of time and clothing on body fluid identification, and their posterior use for short tandem repeats (STR) profiling over time.

Objective

The present work aimed to study the identification of blood and semen stains, and DNA recovery over time up to three months after deposition on five different clothing, applying rapid immunochromatography tests.

Figure 1. Experimental procedure. DNA was extracted by using a modification of the DNEasy Blood and tissue kit (Qiagen) protocol. Blood and semen presence were assessed using SERATEC® tests, and STR profiles were determined for each sample.



Materials and Methods

This experimental design and procedure were carried out using SERATEC® HemDirect and SERATEC® PSA Semiquant for laboratory application.

Results

It was possible to detect semen and blood up to three months after deposition with both tests. The intensity of the bands varied among clothing and time (Figure 2). It was also possible to determine STR profiles from samples both of blood and semen after three months after deposition (Figure 3).

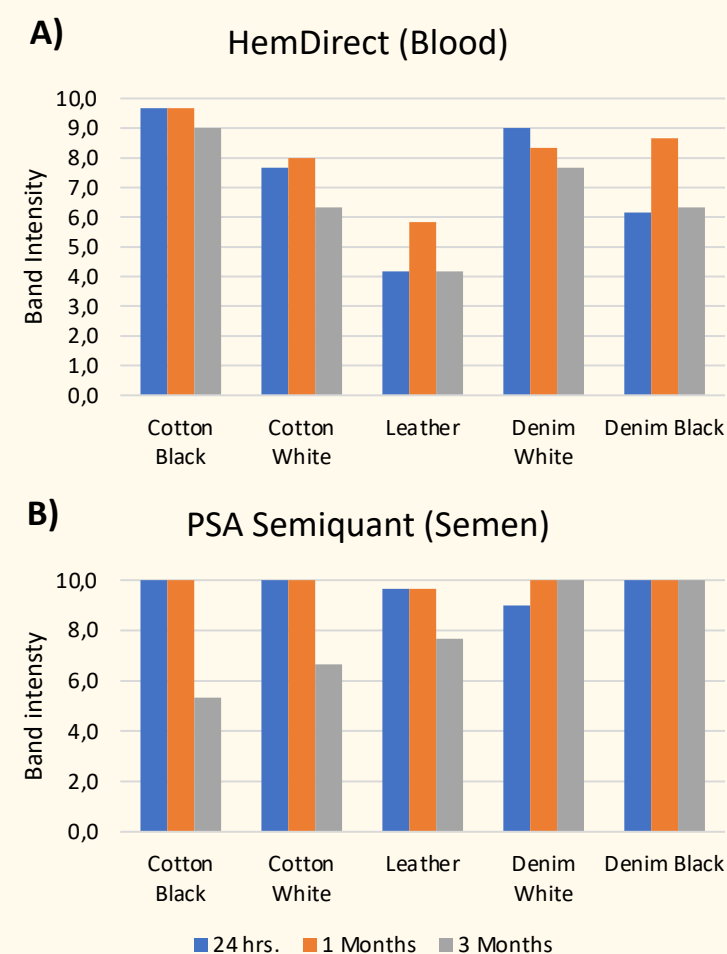


Figure 2. Average DNA concentrations per fabric, time, and tests. A) Blood samples; B) Semen samples.

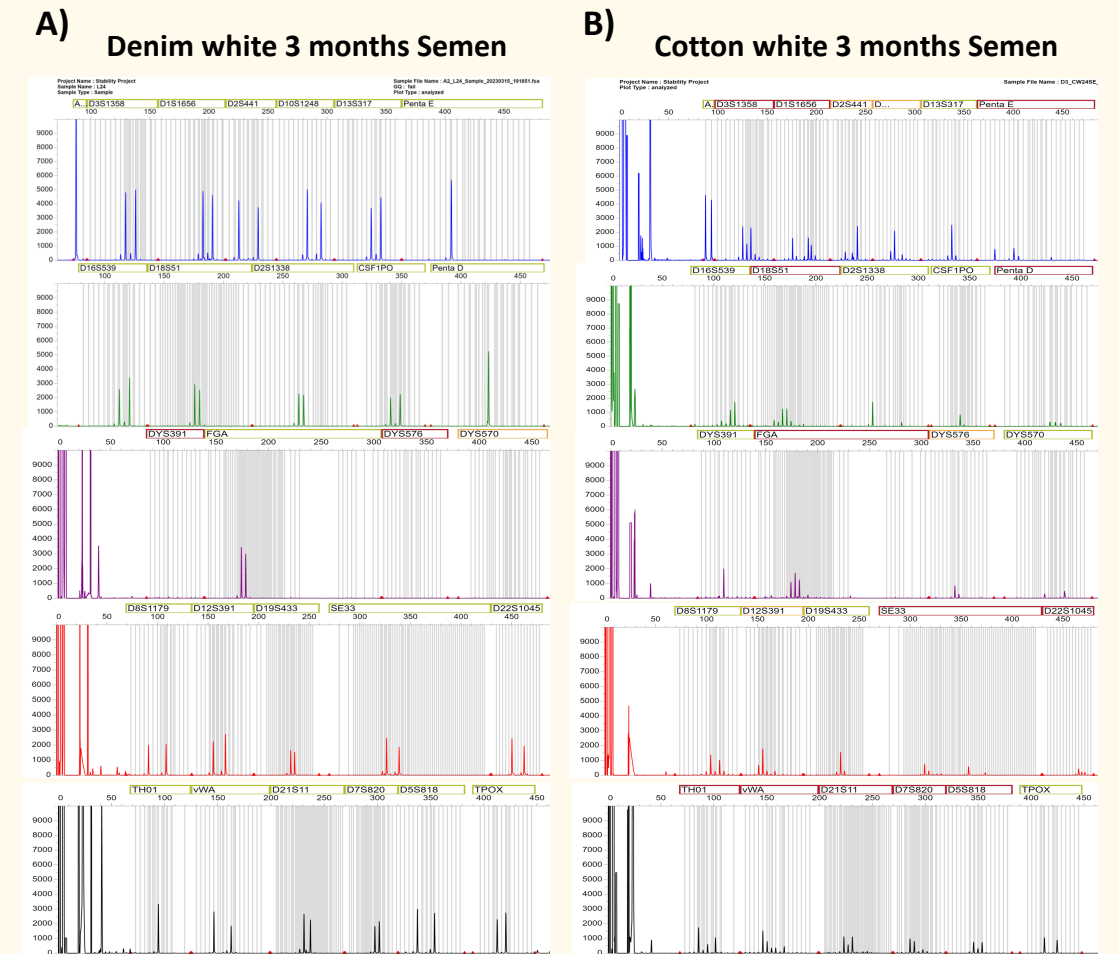


Figure 3. Representative STR profiles from samples extracted from different clothing and deposition times. A) Denim white semen sample 3 months; B) Cotton white semen sample 3 months.

Conclusions

These findings indicate that it is possible to recover and identify blood and semen samples up to three months after deposition, also obtaining DNA profiles. Future research will be able to expand the results, assessing the detection of body fluids in other clothing and different environmental conditions.