

Evaluation of the detectability of different ages of bloodstains on fabrics in different washing conditions and at various wavelengths

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Abstract

Purpose: The detection of bloodstains at crime scenes is extremely useful in forensic investigations. This study aimed to investigate the effects of washing temperature, fabric type, fabric color, and stain age (time from staining to laundering) on the detection and identification of bloodstains on fabrics after washing.

Material and method: A total of 240 fabrics (4 different colors and 5 different types) were stained with blood and washed in 4 different washing temperatures with 3 different lag times. The evaluations of fabric images were performed using the FLS system (Forenscope-Mobile Multispectral UV-VIS-IR Imaging Systems®) on a total of 1200 images using 5 different wavelengths and filter options. The bloodstained areas of the fabric pieces were then excised, and the hemoglobin presence was analyzed using the SERATEC® HemDirect hemoglobin test.

Results: The analyses of laundered samples using the FLS system revealed that the best images were obtained from velvet, cotton fleece, denim, and polyester fabrics, in that order. Except for polyester fabrics, the SERATEC® HemDirect hemoglobin screening test, which was used to detect bloodstains on fabrics, showed positive results after washing at low temperatures (approximately 15 °C and 30 °C). At higher temperatures (60 °C and 90 °C), the SERATEC® HemDirect hemoglobin test yielded negative results.

Conclusion: The fabric type and color played a crucial role in stain detection using the FLS system on the laundered fabrics. The FLS system and the SERATEC® HemDirect hemoglobin test revealed that stain age had a limited effect on the stain's detectability.

Source

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