



A6 Detection of Altered Bloodstains with BlueStar®

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The goal of this presentation is to discuss how the ability to prevent detection of blood stains deposited on common building materials as substrates by the use of common household cleaning products was investigated with the use of the relatively new BlueStar® blood detection reagent.

This presentation will impact the forensic science community by highlighting the fact that bloodstains that have been “washed” or potentially altered at a crime scene, can still be revealed days and months after attempts at removal.

After attending this presentation, attendees will understand that latent blood that has been attempted to be removed, destroyed, or altered can still be detected days and months after deposition and “clean-up.” Using the following list of common building materials as substrates, and household cleaning products to eliminate blood evidence, the blood could still be detected with BlueStar®.

Substrates Household Cleaning Products Linoleum Water
Tile Dawn Ultra Concentrated Liquid Soap-Original Scent Drywall Bleach- Clorox Liquid
Bleach: Clean Linen Scent Carpet Resolve Triple Action Spot Carpet Cleaner
Hoover Premium Pet Formula Detergent Lysol Disinfectant All Purpose Cleaner 4 in1

Substrate materials (1ft x 1ft) were prepared in groups of four sets and kept for each designated time interval after deposition of blood (1,7,30 and 60 days). The total number of squares used for the experimental study was sixty-four. 15 ml Blood was deposited on each substrate and allowed to dry indoors for two hours. The linoleum, tile, and drywall were cleaned using water, soap and water, Clorox Bleach, and Lysol. The carpet was cleaned using water, soap and water, Resolve Carpet Cleaner, and a Hoover Premium Pet Formula detergent in combination with a Hoover Steam Cleaner.

Latent blood was found to be detectable, regardless of cleaning method, throughout the two month period that the substrates were being evaluated. This study showed that certain types of cleaning methods will alter detection of blood not only immediately, but also over extended periods of time. Results showed that overall those substrates cleaned using a chemical method (i.e., Clorox Bleach, Lysol) presented a significant decrease in detection of the latent blood. This detection was demonstrated by decreased luminescence using the BlueStar® reagent. The effects of time on latent blood detection with BlueStar® appeared to be in direct correlation to the attempted clean-up method used. Clean-up of blood using chemical methods presented decreased detection, presumably because of altered peroxidase activity of hemoglobin in the blood trace evidence.

Detection was rated on a visual scale defined as negative or positive (+ to +++) when viewed in dim light. The results were recorded photographically and showed that BlueStar® is capable of detecting latent blood on a wide variety of substrate types often encountered at crime scenes after attempts to “clean-up” the evidence by the use of a variety of common household cleaning products.

For optimal effectiveness, BlueStar® should be used as soon as possible after opening. The elapsed time from which the BlueStar® was opened and when it was used to process the substrates appears to have some effect on its chemiluminescent quality. Overall, BlueStar® was effective in detecting the latent blood on all substrates regardless of the cleaning method to remove the blood evidence.

The detection of latent blood during criminal investigations can provide clues about the reconstruction of events at a crime scene. This research demonstrated the resilience of human blood to total eradication using common household cleaning products and after delay until detection (up to two months). The ability to detect latent blood using BlueStar® was after attempts at removal and long periods of delay until detection.

BlueStar®, Bloodstain, Chemiluminescent