## Y13 The Effects of Household Cleaners and Paints on the Detection of Bloodstains Over Time

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**Learning Overview:** After attending this presentation, attendees will better understand the potential effects on bloodstains from household cleaning products and paint products used when attempting to alter or eliminate bloodstain evidence at a crime scene.

**Impact on the Forensic Science Community:** This presentation will impact the forensic science community by: (1) identifying potential methods that criminals may use to hide or cover up bloodstains; and (2) illustrating potential challenges with the current methods of bloodstain detection.

Blood and bloodstain patterns are often valuable sources of evidence found at crime scenes. It may be found that the suspect or suspects in the case have attempted to clean up the blood evidence in an attempt to destroy any probative value of such stains. Because of these attempts at clean up, it is important for crime scene specialists and investigators to be aware of the potential challenges that may be faced with collecting or analyzing blood evidence at such a crime scene.

Kastle-Meyer (a phenolphthalein test) has been used for more than 100 years as a sensitive method for the detection of possible blood.[1] Chemiluminescent reagents may be used in conjunction with Kastle-Meyer in an effort to detect "invisible" blood, to include blood or bloodstain evidence in which an attempt has been made to alter or destroy it. Despite the sensitivity of the Kastle-Meyer test and chemiluminescent reagents, there may be unforeseen challenges facing those who process the crime scene and collect bloodstain evidence.

Previous research has demonstrated both that the physical chemiluminescence properties of bloodstains can be altered by cleaning products and that paint will affect the detection of bloodstains; however, research on the effects of both the cleaning and concealment of bloodstain evidence is scarce.[2-4] Additionally, there seems to be a lack of applied research regarding the effects of clean-up on bloodstains; no previous study has discussed whether a bloodstain can be covered up and rendered undetectable by traditional forensic means. A grant awarded to Arizona State University through the National Science Foundation focusing on the implementation of a course-based undergraduate research experience allowed for the development and execution of a research project that would address the lack of applied research in this area.

Blood was applied to a substrate that mimics a substrate that is commonly found at crime scenes and was left to dry. Each bloodstain was subjected to a different combination of clean-up and cover-up procedures. Following these procedures, two common forensic blood indicator tests were used. The results of both the controls and the experimental bloodstains yielded surprising results despite the sensitivity of both the Kastle-Meyer and chemiluminescent reagents, regardless of the clean-up and concealment that took place. The implication of both sets of results could manifest differences in the method for which a crime scene may be processed; investigators could derive helpful information from concealed or covered-up bloodstains, but only if they are aware of the presence of such evidence.

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**Reference(s):**

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**Bloodstains, Chemiluminescence, Household Cleaners**