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Project Title: A Comparative Analysis of Commercially Available Protein and Peroxidase Reagents for Blood Detection and Enhancement on Laundered Clothing

Abstract:

Blood on a suspect or victim's clothing is not uncommon in criminal cases involving violent incidents, and often these stains will be washed away in hopes to destroy the evidence. This study aims to produce a comprehensive analysis of three protein based reagents and three peroxidase based reagents commonly used and commercially available for the detection of trace amounts of blood on laundered clothing. Enhancement reagents Hungarian Red, Coomassie Blue, Amido Black, luminal, Bluestar® Forensic Magnum, and aqueous Leuco Crystal Violet (LCV) were used to detect 100 µl human blood stains on varying fabric types and colors (white cotton, black cotton, blue denim, white polyester, and black polyester) at a range of blood dilutions (neat, 1:10, 1:10², 1:10³, 1:10⁴, 1:10⁵, 1:10⁶) after laundering to determine the usability and sensitivity of the reagents. This study revealed that the peroxidase based reagents produced the greatest sensitivity on the natural fabrics, reacting positively down to a blood dilution of 1:10³. The protein reagents produced greater sensitivity on the synthetic fabrics, reacting positively down to a blood dilution of 1:10. Peroxidase stains relying on chemiluminescent properties rather than colorimetric results produced better results on the dark colored fabrics. The results of this study suggest the importance of laundered clothing as evidence and provides an analysis of these six reagents for blood detection on fabrics after blood evidence has been washed.