

B52 STK[®] Sperm Tracker as a Presumptive Test for Semen Stain Detection

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Learning Overview: After attending this presentation, attendees will understand the results of a study designed to test the performance and sensitivity of STK[®], an alternative method for semen stain detection, compared to traditional serological techniques.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by describing the benefits and challenges of STK[®] as a presumptive semen identification technique on sexual assault evidence items.

Traditional methods for semen stain identification, such as Alternative Light Sources (ALS) and the Acid Phosphatase Spot Test (AP), can present issues for forensic examiners, especially in regard to sensitivity, specificity, and efficiency. To address these challenges, STK[®] was developed as a rapid, specific, and non-toxic method for semen stain detection on sexual assault evidence. STK[®] is a presumptive test for human semen identification, reacts specifically with human prostatic acid phosphatase, and is available in paper and spray versions.

This study evaluated STK[®] paper and spray with various dilutions of semen stains on cotton fabrics, per the manufacturer's specifications, as well as with slight protocol modifications. Results showed that STK[®] paper performed best on blue denim, white denim, and a black bedsheets, while STK[®] spray performed best on a white bedsheets when following the manufacturer's protocol. Modifications, including the simultaneous application of STK[®] spray and paper as well as increasing STK[®] spray concentration, were made to determine if signal detection could be improved; however, those changes only helped in a limited number of instances.

Additionally, this study tested STK[®] sensitivity by detecting semen stains on non-laundered and laundered denim and white bedsheets fabrics in comparison to ALS followed by AP. For non-laundered fabrics, ALS and AP performed the best overall on the blue denim, while STK[®] spray performed the best on white bedsheets. For laundered fabrics, signals were clearly visualized with ALS on white bedsheets and less so on blue denim, while faint signals appeared with STK[®] spray on white bedsheets only; STK[®] paper did not produce any signals on these fabrics. Finally, it was determined that STK[®] does not affect GlobalFiler[™] and Yfiler[™] Polymerase Chain Reaction (PCR) amplification for downstream Short Tandem Repeat (STR) analysis.

In summary, STK[®] showed promise in certain scenarios but nevertheless, traditional ALS in conjunction with AP may remain the preferred approach for presumptive testing of semen on the types of cotton materials tested here. STK[®] paper worked better than spray on thicker and darker fabrics; however, its set-up was slightly more cumbersome than any other test in this study. STK[®] spray performed well on white bedsheets, but less so after being laundered, and its ease-of-use may also be suitable for non-fabric evidence items and large areas in the field. Regardless, STK[®] spray may prove useful for forensic examiners when testing white bedsheets because it could replace the ALS and AP steps, helping to increase the efficiency and accuracy of semen serological testing. Additional testing of other fabrics and substrates is warranted.

STK[®] Sperm Tracker, Semen Identification, Presumptive Testing