



A157 Re-Evaluation of the Seratec[®] PSA Semiquant Test for Use at the United States Army Criminal Investigation Laboratory

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After attending this presentation, attendees will be educated regarding the detection of PSA using the Seratec[®] PSA Semiquant test on samples and how the United States Army Criminal Investigation Laboratory (USACIL) has addressed low levels of PSA present in casework.

This presentation will impact the forensic science community by increasing awareness about false positive PSA results using the Seratec[®] PSA Semiquant test when performing the test on evidentiary samples. Knowing what substances can be attributed to false positive reactions to the Seratec[®] PSA Semiquant test, and how to dilute them from the sample without compromising the examiner's ability to identify semen, would help to improve confidence in the results that are presented in court.

It is known that semen contains a high concentration of PSA, making PSA a useful biological marker to identify semen. The Seratec[®] PSA Semiquant test has been determined to be a valid and reliable method for detecting semen in biological stains. The test works by detecting PSA using two monoclonal antibodies that combine with the PSA to form a complex which is visualized as a red line on a membrane. The sample is extracted in a buffered solution to maintain a constant pH and to help it travel through the test strip. It is also well documented that a small chance of false positive PSA results in the absence of semen. Sometimes these results are from elevated PSA due to a biological phenomenon in an individual. Other times this is a result of non-biological material mimicking a positive result on the test strip. In the literature it has been noted that a change in pH due to the addition of organic acids (citric acid, acetic acid, and oxalic acid) can cause a false positive band on the Seratec[®] PSA Semiquant card. Examiners at USACIL perform Acid Phosphatase (AP), PSA, and microscopic examinations on a sample to determine if semen is present. Sometimes all three tests are performed on the same cutting. If a sample is only PSA positive an immunological indication of semen is reported. A review of cases at the USACIL has noted the presence of weak positive PSA results with no male DNA detected in multiple samples from different cases. In order to determine if a case sample is truly positive for semen, a study was performed to test various non-biological samples in order to isolate any that may show a false positive PSA result. Diet soda, alcoholic beverages, tooth paste, lubricants, douche, mouthwash, and various other substances were tested. During preliminary studies it was found that diet sodas gave false positive results when diluted one to one in PBS. The effects of AP reagent on the Seratec[®] PSA Semiquant test were also examined to determine if there was any interference occurring. Various dilutions were performed to determine if any changes to the current USACIL protocol can help eliminate these false positive results while still being able to detect low levels of PSA from semen.

Seratec[®], PSA, False Positive