SERATEC®

TECHNICAL NOTE

Evaluation of the SERATEC® PAM Test Streamlining Semen/Saliva Screening

AT A GLANCE

DNA Labs International evaluated the SERATEC® PSA/AMY Test Card across a range of forensic sample types.

The dual assay consistently detected PSA and α-amylase with high sensitivity and specificity, including in mixtures and challenged stains.

Findings support its use as an efficient, sample-conserving tool for routine serology.

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Evaluation of the SERATEC® PAM Test

In forensic casework, we all face similar constraints: high sample loads, limited material, and the constant need to balance speed with court-defensible accuracy. Many traces arrive with only a small amount of usable evidence, and every part of it taken for serology reduces what remains for DNA analysis or potential re-testing, sometimes years later. This is why efficient, sample-conscious workflows are so essential, particularly when screening for semen and saliva, which traditionally requires separate tests and multiple cuts or swabs.

The SERATEC® PAM Test was developed with exactly these realities in mind. By detecting prostate-specific antigen (PSA) and α -amylase simultaneously in a single chromatographic immunoassay, the dual assay allows analysts to screen for two key body fluids using a single sample. It simplifies routine serology, conserves material and does so without adding new steps or complexity to everyday bench practice.

The evaluation began when a customer expressed interest in using a dual PSA/α-amylase test for casework, prompting Kristin Beyers' validation team at DNA Labs International (DLI), an ISO/IEC 17025:2017and FBI QAS -accredited forensic testing laboratory in Florida (USA), to assess whether the SERATEC® PAM Test could meet that need. Research and Validation team member Andre Katrick led the project conducting the hands on testing, examining sensitivity, specificity, mixtures, mock casework and environmentally challenged traces. The results, presented at the International Symposium on Human Identification (ISHI) in Florida (November 2025), showed consistent and reliable detection across all tested conditions, supporting routine implementation in forensic serology.

This Technical Note summarizes those key findings and outlines how the PAM Test fits into everyday bench workflows, helping to enhance throughput, preserve evidence and deliver clear serological results that support casework resolution.

Materials and Methods

DLI evaluated the SERATEC® PAM Test under routine forensic serology conditions. The test card layout showing the PSA (P), α -amylase (A) and control (C) lines is illustrated in Figure 1.

Figure 1: Test Card Layout PSA (P), α -amylase (A) and control (C

Sample Types

- Liquid semen and saliva (10-fold dilutions)
- Semen and saliva stains
- Semen/saliva, semen/blood and saliva/blood mixtures
- UV- and sunlight-exposed stains
- Mock casework samples (proficiency stains, touch swabs)

Liquid semen from two donors (designated donors 3 and 4) and liquid saliva from two donors (designated donors 1 and 2) were used to prepare certain test samples. These same donor materials were used across the relevant stain, inhibition and comparative studies.

Sample Preparation

- Liquid samples were diluted 1:10 in SERATEC® dilution buffer.
- Stain cuttings and swabs were incubated for 10 min in 300 µL of SERATEC® dilution buffer, then placed into a spin-basket and centrifuged at 10 000 rpm for 3 min.
- A total of 120 µL of extract were applied to the test card, and results were read at 10 min.

Assay Interpretation

After a 10-minute development time, up to three lines became visible and could be interpreted as follows:

- P line (PSA) - only visible when the sample is PSA-positive
- A line (α-amylase) - only visible when the sample is α-amylase-positive
- C line (control) - only visible with a successful test

Line intensity varied according to antigen concentration, consistent with lateral flow assay principles. The workflow matched standard serology practice and required no procedural changes.

Results

The results across all sample series demonstrated consistent patterns in sensitivity, specificity and overall performance.

Specificity

Specificity testing showed correct positive results for semen and saliva and confirmed that all non-target body fluids (blood, urine, nasal swabs and water) produced negative results, as summarized in Table 2.

Table 2. PSA/AMY Test Card Specificity Study Results

Sample	PSA	α-Amylase
Semen*	(+)	(-)
Saliva*	(-)	(+)
Blood	(-)	(-)
Urine	(-)	(-)
Nasal swab	(-)	(-)
Water	(-)	(-)

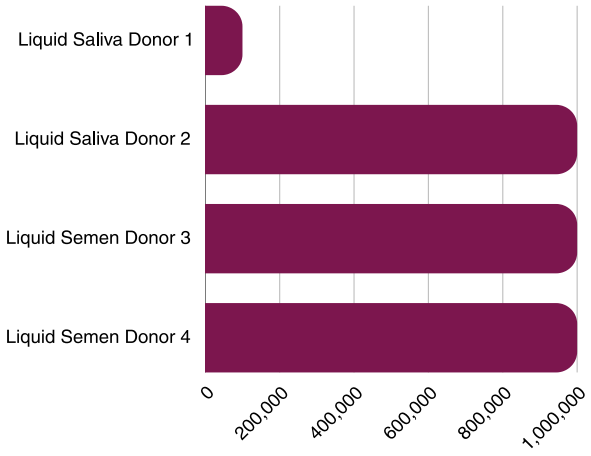
**Test card results from liquid sensitivity testing was used to determine specificity for these samples.(-) denotes a negative test result and (+) denotes a positive test result.*

Sensitivity

Liquid samples:

PSA remained detectable in liquid semen from both donors down to a 1:10,000 dilution (faint at 1:10,000). α-amylase remained detectable in liquid saliva to 1:1,000 for donor 1 and to 1:10,000 for donor 2. At the highest-concentration samples (neat and 1:10), faint lines were consistent with the expected high-dose hook effect. No cross-reactivity was observed: semen samples were α-amylase-negative and saliva samples were PSA-negative across the dilution series (Fig. 2).

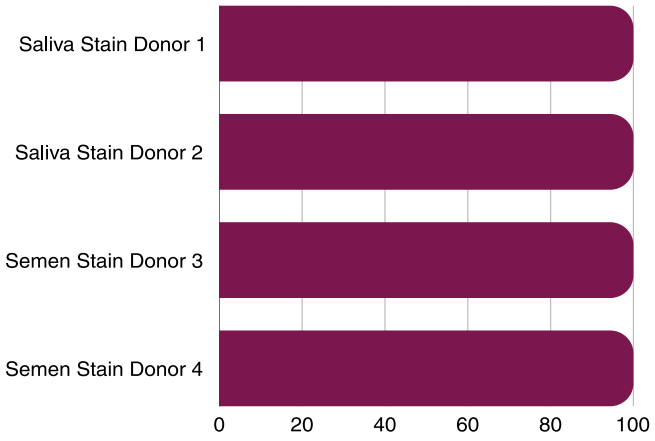
Figure 2: Liquid Sample Dilution Series



Stain samples:

In stain extracts, semen stains showed PSA positivity down to a 1:100 dilution (faint at 1:100), and saliva stains showed α-amylase positivity down to a 1:100 dilution (faint at 1:100). Stain profiles remained fluid-specific, with semen stains PSA-positive/α-amylase-negative and saliva stains α-amylase-positive/PSA-negative (Fig.3).

Figure 3: Stain Samples Dilution Series



Mixture Studies

In mixed-body-fluid samples, the PAM Test produced clear and interpretable patterns. Semen/saliva mixtures generated dual PSA and α-amylase positives down to 1:1,000. In semen/blood mixtures, PSA remained detectable through 1:1,000 with α-amylase consistently negative, while saliva/blood mixtures showed α-amylase positivity down to 1:100 with PSA remaining negative. These profiles were visually distinct and matched the expected biological compositions, demonstrating reliable performance in mixed matrices.

Inhibition Studies

Environmental exposure had only a limited impact on detection. Semen stains from donor 3 and saliva stains from donor 1 remained correctly positive for their respective analytes after UV exposure and after ten days of sunlight. Line intensity was reduced compared to untreated stains, but the expected PSA-positive / α-amylase-negative pattern for semen and α-amylase-positive / PSA-negative pattern for saliva remained clearly interpretable. These findings indicate that the assay maintains reliable performance even in environmentally challenged traces.

Mock Casework

In the mock casework samples, including semen-positive and semen-negative proficiency stains, as well as touch items such as a cup rim and a straw, the PAM Test produced result patterns fully consistent with prior sample characterization.

Semen-positive proficiency stains generated clear PSA lines, while semen-negative stains yielded PSA-negative profiles as expected.

Touch samples associated with saliva produced α-amylase-positive and PSA-negative results. Together, these findings demonstrate robust performance across realistic substrates and biological loads, reflecting typical conditions encountered in routine casework.

Conclusion

The evaluation conducted by DNA Labs International demonstrated that the SERATEC® PAM Test performs reliably across the full range of samples commonly encountered in forensic serology. PSA and α-amylase were detected at low dilution levels in both liquid samples and stains, with clean specificity and no cross-reactivity. The assay performed robustly in mixtures, environmentally challenged samples and mock casework, producing consistent and interpretable results across all tested conditions.

Overall, the findings support that the PAM Test is sensitive, specific and practical for routine casework, providing two essential serological results from a single sample.

In summary, forensic laboratories work under constant pressure to balance efficiency, evidence preservation and reliable interpretation. A dual assay that consolidates two routine tests into one sample aligns well with these practical needs. The PAM Test offers a straightforward way to reduce sample consumption, streamline screening and maintain clarity in serological results without changing established workflows.

With independent data from DLI and the ease of integrating the test into everyday bench practice, the PAM Test provides a simple and effective tool for casework where time, material and accuracy all matter. It supports analysts in delivering unambiguous, defensible results and contributes to the broader goal shared across the field: helping cases move forward with confidence and integrity.

Reference

1. Kartick A (presenter) Beyers K, Melayes J, Ouelette M, Taveras G, Tovar N. ISHI Poster: Evaluation of the SERATEC® PSA/AMY Test Card (PAM-Test) . DNA Labs International. ISHI 36, West Palm Beach, FL, November 2025.

About DNA Labs International

Founded in 2004, DNA Labs International is a private, women and family-owned forensic DNA testing laboratory. Our work is deeply personal-we commit ourselves to the victims, their families, law enforcement agencies, and one another as part of the DLI family.

Innovative technologies

We are honored to lead the community in adopting new and innovative technologies to improve casework outcomes. Our portfolio is the most advanced of any private forensic laboratory, offering a wide range of techniques and skills.

Collaboration

DNA Labs International collaborates with all members of the forensic community to develop new technologies and share knowledge. Our team of DNA analysts, genealogists, and client experience specialists are widely recognized as some of the best in the field. We are dedicated to building partnerships across the forensic landscape.

Dedication to justice

Everyone deserves justice. We are committed to the success of law enforcement, forensic labs, attorneys, and advocacy groups who seek answers for victims of crime. When you trust us with a case, we treat it like our own. Our team leads with care, listens first, and works shoulder-to-shoulder with you to move cases forward and employs every technique to accomplish your goals.

Creating a safer world with you.

We are your partners in solving crime.

About SERATEC®

SERATEC® is a biotechnology company based in Göttingen, Germany, specializing in smart solutions for forensic biology. Our team brings together professionals from diverse scientific and technical backgrounds, united by a shared passion for advancing forensic science. We develop and produce high-quality test systems that help laboratories and investigators worldwide identify biological traces quickly, reliably, and with confidence.

Founded in 1987 as a university spin-off, SERATEC® has grown from a small start-up into a specialized and internationally respected company in forensic biology.

After a generational transition, the company is now led by a dynamic team of experts dedicated to innovation and continuous improvement. Since the early 2000s, our work has focused almost exclusively on forensics, with a particular emphasis on the rapid detection of relevant biological markers that add value to evidence interpretation.

Our tests are used worldwide in forensic laboratories, crime scene units and research settings. We work closely with practitioners to ensure that each assay integrates smoothly into established workflows and supports efficient, sample-conscious casework.

Our mission is simple: to deliver practical science with uncompromised quality.