



B39 A Determination of the Optimal Method for the Detection of Vaginal Fluid

Melissa Rogers*, North Wales, PA 19454; Lawrence Quarino, PhD, Cedar Crest College, Allentown, PA 18104; Amrita Lal-Paterson, MSFS, Division of Forensic Science, Wilmington, DE 19801; Janine Kishbaugh, MS, Cedar Crest College, Allentown, PA 18104

Learning Overview: The goal of this presentation is to demonstrate the methods that have proven to differentiate vaginal fluid from other body fluids, such as saliva and urine.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by providing the foundation for a potential confirmatory test for vaginal fluid, and so provide context for sexual assault investigations.

With the advent of DNA and the potential to be corrupted by bias, many people, including forensic scientists, have forgotten the importance of applying context to the evidence of a particular case. DNA may be present at a crime scene, but without context, that DNA evidence may be interpreted incorrectly. Identifying the body fluid from which the DNA came can provide information of how the DNA came to be there. Forensic science literature presents a number of tests to confirm the presence of various bodily fluids; however, such a test for vaginal fluid is still needed.

A confirmatory test for vaginal fluid will provide critical context for forensic casework, especially in sexual assault cases where no semen is present. In this study, different methods were examined to detect and confirm the presence of vaginal fluid on “used” condoms donated by women of different ages and then tested over periods of time. Following Institutional Review Board (IRB) approval, multiple samples were obtained from more than 20 volunteers. After extensive validation, a tandem method is proposed that provided robust results over all demographic groups tested.

The first method utilizes the Periodic Acid-Schiff (PAS) reagent to stain glycogen present in vaginal epithelial cells in a histochemical reaction.¹ The reagent proved to be an improvement over Lugol’s iodine, which was more commonly used in forensic labs.² Of 20 vaginal fluid samples tested on women ranging in age from 24–82 years, all produced positive results with no false positives observed with corresponding saliva and urine dried stains. These visual results were bolstered by using cellSens software with an Olympus® Polarized Light Microscope to photograph the stained slides and measure the Red, Green, Blue (RGB) values of each photo.

The second method utilizes real-time Polymerase Chain Reaction (PCR) to amplify genetic sites in three bacteria typically associated with the vaginal cavity: *L. crispatus*, *L. iners*, and *L. gasseri*.³ This method also proved effective; while some of the bacteria were also present in saliva and urine, more amplified product was observed in vaginal fluid samples, as well as used condom samples.

Not only do these results bring to light more effective detection methods for vaginal fluid, but they also provide the foundation for a potential confirmatory test that could be used in serology laboratories Utilizing and validating these methods is vital for aiding in sexual assault investigations. The detection of vaginal fluid in cases could provide the context needed to solve these heinous crimes.

Reference(s):

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3. De Vittori E., Giampaoli S., Barni F., Baldi M., Berti A., Ripani L., et al. Improvement and automation of a real-time PCR assay for vaginal fluids. *Forensic Sci Int* 2016 Mar;(262):179-182.

Periodic Acid-Schiff, *L. crispatus*, *L. gasseri*