

## B69 Human Identification From Washed Semen Stains

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**Learning Overview:** After attending this presentation, attendees will understand that violence in a society may exhibited be in various ways. The most important evidence of physical violence is biological evidence, such as blood, semen, saliva, hair, and nails. Blood and semen stains are the most common evidence of violence against women. The most important evidence to find the suspect of sexual assault are semen stains. In many studies, it has been observed that rapists do not use condoms in many cases and transfer seminal fluids over the body of the victim, to their own clothes, bed linen, or other objects in the environment.<sup>1</sup> This reveals the necessity of examination of the bed linen and the victim's underwear during crime scene investigations. However, in many cases, it has been seen that the rapists and the victims tend to clean their bodies and clothes because of psychological conditions such as fear, panic, and anxiety. They may even hide the underwear for a long period of time.<sup>1</sup> This leads to the loss of hope for the victims who could not call upon the judicial units immediately after the incident due to several reasons and decided to complain later.

**Impact on the Forensic Science Community:** The victim who suspects the results obtained from the authorities may tend to hide the clothes and may not hand the physical evidence to the laboratory.<sup>2,3</sup> However, recent studies show that DNA can be obtained from clothes that are washed more than once in different temperatures.<sup>2</sup> Due to the characteristics of seminal fluid and the fact that sperm cells get stuck in fabric fibers, DNA can be obtained after clothes have been washed more than once. The amount of DNA isolated may differ depending on the type of cleaning reagent that was used, type of stained fabric, temperature, and drying conditions as well as the preservation period.<sup>1-3</sup> This presentation will impact the forensic science community by demonstrating whether DNA can be obtained from washed underwear to evaluate the amount of isolated DNA and by showing if identification can be made with the obtained DNA.

In this study, both cotton- and nylon-blended fabrics were stained with semen samples taken from volunteers. Semen stains on the fabrics dried at room temperature were washed with detergent at 40°C, 60°C, and 90°C and dried again at room temperature. The washed and dried pieces of fabric were examined by Ultraviolet (UV) light source and stain residues were made re-visible. After this step, DNA was isolated from the stained part of each washed fabric by two different isolation methods.

As a result of this study, comparisons could be made on DNA isolation methods, washing conditions, and how much DNA could be obtained on different washed fabrics. The limits in which conditions for washed semen stains are sufficient for DNA analysis are drawn.

In conclusion, this study reveals the necessity of more detailed and careful studies on the washed laundry sent to criminal laboratories for examination. It gives hope to the victims who have not been able to go to judicial units immediately after the incident because of fear or for any other reason, and who think that they cannot get results because they have washed the laundry. This also sheds an important light in the interest of justice.

### Reference(s):

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2. Nolan, A.; Speers, S.J.; Murakami, J.; Chapman, B. A pilot study: The effects of repeat washing and fabric type on the detection of seminal fluid and spermatozoa. *Forensic Science International* 2018, 289, 51-56.
3. Kulstein, G.; Schacker, U.; Wiegand, P. Old meets new: Comparative examination of conventional and innovative RNA-based methods for body fluid identification of laundered seminal fluid stains after modular extraction of DNA and RNA. *Forensic Science International: Genetics* 2018, 36, 130-140

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