



**DNA LABS**  
INTERNATIONAL

EXPERIENCE • TECHNOLOGY • RESULTS

240 SW Natura Avenue • Deerfield Beach, FL 33441

Tel. 954.426.5163

[www.dnabslabsinternational.com](http://www.dnabslabsinternational.com)

An FQS-I ISO 17025 Accredited DNA Laboratory

## **M-VAC®:**

### ***A Superior DNA Collection Method***

**by Cristina Rentas, DNA Analyst, DNA Labs International**

As DNA technology has become more sensitive over the years, there has been an increase in the number of samples that laboratories are receiving with requests for DNA analysis on “touch” DNA samples. Touch DNA samples refer to samples where biological fluid cannot be detected, however there may be skin cells left behind due to contact with an item. In cases where the scientist is attempting to collect touch DNA for analysis, it is often difficult to collect a sufficient amount of DNA to generate a profile suitable for comparison. In the past, the accepted collection method has been to vigorously swab a sample with a cotton swab and forward the swab for DNA analysis. The M-VAC® collection system was validated by DNA Labs International and has been in use since 2014 in an attempt to improve results from touch DNA samples.



*The M-VAC® System*



The M-VAC® collection system utilizes the same principles as a wet vacuum. First, a DNA-free buffer is sprayed onto the surface of the sample using the M-VAC®’s sampling head. Then, a vacuum pressure is applied over the sprayed area of the sample, so that the buffer can be re-collected. The re-collected buffer now contains suspended particles including the DNA contained on the sample. The buffer is then poured through a sterile filter where the biological material binds to the filter and becomes concentrated. The filter can then be sent forward to the extraction process in the laboratory.

Over the past two years, DNA Labs International has utilized the M-VAC® system on a wide variety of samples, including items such as clothing, ropes and cars. One of the most common problems that forensic scientists encounter when screening clothing items for DNA is that there

is often a great amount of DNA from the wearer, but very little from individuals that came into contact with the wearer. This is a situation where the M-VAC® collection system can be very helpful.

Recently, the M-VAC® collection system was instrumental in solving a homicide. The victim was murdered and the suspect emptied the victim's pant pockets. The pants pockets were swabbed and the swabs were submitted for DNA testing. The DNA profile obtained from the sample after swabbing was performed contained a mixture that could not be interpreted due to its complexity. The pants were then submitted to DNA Labs International for testing in order to see if the suspect's DNA could be found on the pants pocket. The interior pocket of the pants was sampled using the M-VAC® and the filter was extracted. The DNA profile obtained from the pocket was a mixture of two individuals consisting of a major and a minor DNA Profile. The major DNA profile was consistent with the victim and the minor DNA profile was consistent with the suspect. The chance that an individual chosen at random from the general population would have a profile consistent with the minor profile was more than one in a trillion individuals.



*Buffer containing suspended particles, including the DNA contained from the pants' pocket, is poured through a sterile filter where the biological material will bind to the filter and become concentrated.*

In another case where the M-VAC® collection system was useful for collecting DNA from an article of clothing, the victim was attacked and died of blunt force trauma over a decade ago. Due to the brutality of the attack, there was blood present on a great portion of the victim's clothes. Since it appeared that a struggle had taken place between the victim and the attacker, the M-VAC® was used to collect a sample from the unstained portion of the victim's pant legs. A mixed major DNA profile was obtained from the pant legs as a result. Assuming that there are two contributors to the mixed major DNA profile and that one of them was the victim, a foreign DNA profile was deduced that could be compared to any suspects in the case.

The M-VAC® has also proven to be successful for other types of samples in addition to clothing. It was recently used in a burglary case where an employee entered his store in the morning and found two males attempting to rob the store. After the suspects burglarized the store and had left, the employee found a rope hanging from the ceiling of the store. The crime scene unit swabbed the rope for touch DNA and sent the samples to a laboratory for testing. No DNA profiles were obtained from these swabs. The entire rope was then sent to DNA Labs International for testing using the M-VAC®. The 12 foot length of the rope was sampled and forwarded for DNA analysis. The DNA profile obtained was a mixture with a partial major male

profile and a minor DNA profile. The partial major male profile can be used for comparison to the suspects in the case as a result.

The M-VAC® collection system continues to be a very useful tool while screening evidence, especially in cases where very minor amounts of DNA are present over a large surface area. Using this system, DNA profiles have been generated that were not possible to obtain when other screening methods were utilized.