



A170 Temperature and Humidity Effects on the Stability of Human Odor

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After attending this presentation, attendees will learn the effects of various environmental conditions on the stability and durability of human odor.

This presentation will impact the forensic science community by highlighting the effects of environmental conditions on the stability of human odor. In turn, the information presented will enhance the validity of human scent as a source of evidence when brought into courts of law.

Courts in the United States have increasingly utilized human scent canine evidence as additional scientific research expands in this area. Challenges faced by scent evidence has its roots in the limited number of scientific publications in this field as well as the possible procedural errors made by canine law enforcement personnel in a criminal investigation scenario. Due to the lack of standard protocols, the procedures by which canine scent evidence is collected and handled has a wide range of variation across agencies thus leading to more criticism as to measurable canine performance. This is why there is an extreme importance in assessing proper canine performance so that there is a clear understanding of their capabilities and/or limitations. In general it could be stated that the goal is to obtain a clear understanding of how canines work and what variables affect their detection probability.

Human odor is influenced by a number of different factors such as genetics, biological body functioning and environment conditions. Together, they all directly affect the collected odor samples from any single individual. In turn, the transfer and ultimate detection of this odor by canines could be potentially linked to many variables. The survivability and stability of human odor has been of great interest since it is important to understand how long scent is available after its initial collection or presence at a certain location. Furthermore, it could be of great help to verify through scientific validation the presence of human odor after extreme temperature changes such as explosions, or even when in presence of environmental conditions such as humidity. Thus far, studies have shown the survivability of human scent which was still detectable to the canine in order to make a positive scent match even after undergoing violent thermal conditions. However, even though canine field testing has been conducted, a laboratory approach as to the effects of temperature changes on human odor has not been properly performed.

The goal of this study is to evaluate environmental variables such as temperature and humidity on the stability of human odor samples. Dry scent samples are compared to water saturated scent pads at various temperatures to compare obtained chemical profiles. The studies include an instrumental evaluation via SPME-GC/MS analysis of all collected scent samples. Furthermore, in addition to a headspace extraction of the collected scent pads, a parallel study evaluated the chemical profiles obtained from a direct extraction of the water portion of the scent sample. The hydration technique is used by canine handlers in training procedures and thus will help further elucidate this process. The hydration technique has allowed handlers to train canines at a much faster rate. The training involves the target subject spraying the concentrated scented water along the traveled path. Handlers use different concentrations of the scented water and slowly decrease it until the canine is following nothing but the actual human odor. In this experiment, scent samples are allowed to soak for different time ranges in room temperature water. A fiber optimization is also performed so as to obtain the best results with SPME with a solvent such as water.

In addition to a controlled laboratory study, parallel canine field testing is also conducted to include the above mentioned environmental conditions including survivability of human odor. This field evaluation tests the durability of human odor after extreme thermal changes as seen from collected post-blast debris using human scent specific canine teams to locate and identify individuals who have been in contact with improvised explosive device (IED) components and/ or delivery vehicles. **Human Odor, Hydration Technique, SPME-GC/MS**