



B12 The Effects of Storage Conditions on Human Scent by SPME-GC/MS

Davia T. Hudson, BS, and Allison M. Curran, PhD, Florida International University, University Park Campus, CP 345, Miami, FL 33199; Adeel A. Schoon, PhD, Leiden/Canine Unit Netherlands National Police Agency, PO Box 530, Nunspeet, 8070 AM, Netherlands; and Kenneth G. Furton, PhD, Florida International University, University Park Campus, ECS 445, Miami, FL 33199*

After attending this presentation the attendee will learn about making informed decisions about storage materials and conditions for human scent evidence.

This presentation will impact the forensic community by providing a basis for the creation of an optimized storage procedure for collected human scent.

Recent court rulings have determined that canine human scent identifications can be admitted as evidence in U.S. courts. Canines have been used successfully for human scent identification in European countries for over one hundred years. However, in the U.S., human scent identification has only recently gained acceptance. There are two main methods for the collection of human scent for the purpose of scent identification. There is a direct method in which the actual scented object is collected and presented to the canine and an indirect method in which the odor is collected on an absorber and presented to the canine. In Europe, detector dogs are used in "human scent lineups", where an identification is based on a canine matching the human scent collected from a crime scene to a possible suspect under controlled environmental conditions. In the U.S. specialized bloodhounds are used for the purpose of location checks to aid in criminal investigations. However, there is no optimized or standardized methods for the collection and storage of human scent evidence obtained from objects or people across the various agencies.

Solid Phase Micro-extraction - Gas Chromatography / Mass Spectrometry (SPME-GC/MS) has proven to be a viable method for the extraction, separation, and identification of the volatile compounds which comprise human scent. Human scent, as defined by the authors, is the most abundant VOCs identified in the headspace above scent samples. However, other substances may make contributions to human scent. Studies using SPME-GC/MS have aided in identifying optimal storage materials and conditions of human scent for the purposes of instrumental analysis.

This paper will discuss the contributions of various storage materials including glass vials, polyethylene and polypropylene bags as well as aluminized heavy duty bags. The absorber materials used in this study were pre-treated with a methanol-modified supercritical fluid extraction (SFE) method to achieve analytical cleanliness. Storage studies conducted in triplicate for 1, 2 and 5 week periods, have shown glass to be the storage material which contributes the least amount of compounds to the absorbent materials, whereas the aluminized heavy duty bags contribute the largest. It has been determined that materials used for the storage of collected human scent contribute significant compounds to the collection medium, some of which have been reported as compounds found in human secretions. If a storage material contributes compounds found in human scent the possibility of altering the odor profile through contact exists, thus proving to be a limitation for use in instrumental analysis of human scent as well as creating a greater challenge for the canines.

Various storage conditions for hand odor samples will be discussed as well as the stability of the volatile odor signature of these samples when stored under different conditions as determined by SPME-GC/MS. Cotton absorbers used by the Netherlands National Police for their human scent line-ups which have been pre-treated using SFE, were saturated with hand odor through a 20 minute scenting. The collected hand odor was then placed into a glass vial and subjected to different storage conditions, including: temperature and light effects. The resulting effect of the storage conditions on the initial odor profiles will be presented.

Canines, Human Scent, SPME-GC/MS