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Forensic advantages of safe sex: Odor profiling condom brands using HS-SPME-GC/MS

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Condom substrates are likely to be substantial evidence for sexual assault cases or cases that involve using condoms as improvised carrying containers. Forensic evidence found in sexual assault scenes can range from typical evidence (e.g., fingerprints, broken glass, or hair) to more sophisticated evidence including saliva, semen or DNA. Condom evidence may become more prevalent as more perpetrators try to outsmart investigators by using a condom to prevent leaving behind their biological fluid. To piece together a comprehensive investigation, all types of evidence need to be considered, so if any target evidence is misconstrued, other evidence can be used as corroboration. Condom brand information can be useful in providing more clues in the investigation and in providing chemical information about the substrate that could help other procedures such as fingerprint development run more successfully. DNA analysis might be able to be done, but other less time-consuming tasks need to be explored. Even though some methods of profiling condoms brands have been investigated, they either require relatively expensive equipment or time-consuming sample preparation. To make condom brand profiling more practical, methods that use inexpensive or common equipment need to be explored. Condom odor profiling was done with a relatively inexpensive sampling procedure, head-space solid-phase microextraction (HS-SPME). Sample preparation involved letting the condom sit inside a small vial to allow the chemical odor to build up before sampling with an appropriate SPME fiber. The extracts were analyzed with gas chromatography – mass spectrometry (GC-MS). Optimization procedures included different sampling times and fiber chemistries to evaluate condom volatile odor signatures. The optimal sampling time and fiber are then utilized to sample various condom brands like LifeStyles Extra Strength, Okamoto Crown, and Durex Extra Strength. Each chemical sample is analyzed with GC-MS to obtain chemical profiles further analyzed using principle component analysis.

Biography

Amanda Patrick is a Forensic Science Graduate Student at Texas Tech University. She earned her Bachelor's degree in Mathematics at the University of Texas at Arlington. She is avid about contributing research that will help the justice system. Her research on condom substrates will give another perspective on profiling brands. Some of the results may corroborate with other findings involving condom substrates. The compounds found can be compared with those found using different instrumentation or procedures. The results will potentially contribute in implementing new research on how sexual assault evidence can be better utilized.

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