B202 Quantifying the Efficacy of Cleaning Agents for Removing Drug Background

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Learning Overview: After attending this presentation, attendees will understand how effective five different cleaning methods are at removing both drug particulate and drug residue from two types of surfaces.

Impact on the Forensic Science Community: This presentation will impact the forensic community by providing quantification values for the removal efficiency of fentanyl, carfentanil, cyclopropyl fentanyl, and other drugs from surfaces using five cleaning methods. Results from this study can assist forensic laboratories implement suitable cleaning procedures that fit their criteria.

Good laboratory practices promote cleaning procedures that help maintain workspace surfaces free of contamination after the handling of powders, packaging of evidence, etc. In the laboratory, these procedures aim to reduce exposure to analysts and maintain data integrity. In the field, decontamination efforts help render spaces safe for the public (e.g., methamphetamine remediation). Policy regarding preferred cleaning agents and cleaning frequency varies from laboratory to laboratory. The rise in cases containing highly toxic fentanyl analogs and novel psychoactive substances (NPSs) has forced forensic scientists, crime scene technicians, and first responders to consider the effectiveness of their cleaning and decontamination practices. In addition, it has been the impetus for the authors' laboratory to measure typical drug background levels within a laboratory and identify workflow processes that most contribute to the aerosolization and re-deposition of drug particulate and residue on surfaces.[1] Previous work in the literature shows that drug residues can persist on surfaces at police stations for some time before they sublime, decompose, or undergo photocatalysis, potentially posing an exposure risk.[2] The goal of this work is to validate the effectiveness of cleaning agents at removing drug background. The removal efficiency of a variety of drugs encountered was calculated to determine whether cleaning agents were better at removing a particular class of drugs.

Results from this study established quantitative values for the efficacy of five cleaning methods for the removal of particulate and residual drug samples from laboratory benches and ceramic floor tiles. Ceramic floor tiles were selected as a test surface to represent a surface first responders or hazmat teams may need to clean a spill or bulk material. The five cleaning methods examined were: methanol, soap and water, OxiClean™, adhesive and methanol, and Dahlgren Decon. Both powdered material and residues created from solution deposit were examined on the laboratory bench while only powdered material was examined on the ceramic floor tile. Quantitative analysis was completed using a LC/MS/MS. Four out of the five cleaning agents were found to have greater than 98% removal efficiency for both powders and residues. For two of the cleaning agents, whether the drug was completely degraded was also evaluated. Dalhgren Decon and OxiClean™ were evaluated not only for removal efficiency but also for the extent of chemical decomposition. Samples from ceramic floor tiles found that intact opioids could be recovered from the surfaces and the cleaning solutions, even after thirty minutes of interaction time. The results from these experiments highlight that the performance of typical cleaning agents is likely sufficient in the removal of drugs from surfaces, though additional studies in the appropriate method of implementation are required. Results from this study can assist stakeholders make data-driven decisions on optimal cleaning procedures that address their needs.

Reference(s):

1. E. Sisco, M. Najarro, A. Burns., A Snapshot of Drug Background on Surfaces in a Forensic Laboratory, Submitted to *Forensic Chemistry*
2. G.S. Doran, R.M. Deans, C.D. Filippis, C. Kostakis, J.A. Howitt, Quantification of licit and illicit drugs on typical police station work surfaces using LC-MS/MS, *Anal. Methods.* 9 (2017) 198–210.

Drugs, Cleaning, Quantification