JAY INSLEE
Governor

JOHN R. BATISTE
Chief

STATE OF WASHINGTON
WASHINGTON STATE PATROL
WASHINGTON STATE TOXICOLOGY LABORATORY
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VIA ELECTRONIC MAIL

Mr. Russell Brown
Executive Director
Washington Association of Prosecuting Attorneys
rbrown@waprosecutors.org; WAPA_Notifications@waprosecutors.org

Date: October 31, 2024

Subject: 2024-TLD-02, UPDATE 2024 Third Quarter NIST Environmental Results

Follow-up sample collection was completed on October 10, 2024. Results from the resampling were received on October 24, 2024, and no compounds were detected. The areas were placed back in-service October 25, 2024.

A copy of the NIST results is attached and will be posted to the Toxicology Laboratory website: https://wsp.wa.gov/forensics/toxicology.htm.

For any questions or further information, please contact the Seattle Toxicology Laboratory at toxlab@wsp.wa.gov.

Sincerely,

Elizabeth Gough
Division Commander
Toxicology Laboratory Division

Attachment

October 25, 2024

Quarterly Environmental Sampling – Drug Background Quantitation & Screening Summary Report

The Toxicology Laboratory continues its collaboration with NIST. NIST provides the Laboratory with test kits, which the Laboratory uses to collect environmental samples, and the samples are sent to NIST for testing.

Follow-up sample collection from the three areas with presumptive ketamine screening results from the September 2024 round of environmental sampling was performed on 10/10/2024. The samples were sent to NIST for analysis. A summary of testing performed by NIST is attached (report dated 10/24/24), with test results listed on page 3 of the report. The three re-samples (R-8, R-10, R-15) had no compounds detected when screened by DART-MS.

The regularly scheduled full round of environmental sampling, to include additional samples collected from the counter by hood 5 as well as hoods 4 and 5, is planned for the fourth quarter of 2024.

October 24th, 2024

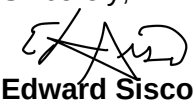
Kari O'Neill
Laboratory Manager
Washington State Patrol
2203 Airport Way South
Seattle, WA 98134

Kari,

Thank you for participating in our study. The following report contains results for the 3 samples collected by the Washington State Toxicology Laboratory in October 2024. The goal of this project was to establish the narcotics background present in a forensic science laboratory. The analysis scheme involved a broad screening of over 1,300 drugs and common excipients.

We would be happy to discuss these results in further detail with you at any time and hope to continue collaborative efforts in the future. If we can be of any assistance to you, please don't hesitate to ask.

Sincerely,



Edward Sisco

Research Chemist
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Drug Background Quantitation & Screening Summary

Introduction

The recent spike in forensic cases containing highly toxic fentanyl analogs highlights the critical need to safeguard analysts from inadvertently encountering these, or other, compounds.[1] Establishing background levels of compounds of interest in a forensic laboratory can provide drug analysts and laboratory quality managers with valuable information to make informed decisions on a range of topics including workflow processes, adequate PPE, cleaning protocols, and occupational safety hazards.

Given that trace amounts of illicit drugs have been reported in a variety of environments, including public spaces,[2] and that instruments continue to improve in sensitivity, it is important to monitor environmental background levels of these compounds. For field and/or screening applications, establishing the background is key to setting instrument detection thresholds and preventing false positives.[3] This is especially critical in environments where there is an expected higher background level such as prisons or border crossings. In a laboratory setting, high environmental background levels can suggest a need to monitor background for data quality and personnel health purposes.

Finally, since forensic laboratories continue to struggle with a high number of emerging drug cases and rising backlogs, opportunities for rapid screening / presumptive testing are desired. The ability to screen evidence in a high throughput manner with little to no sample preparation is currently being investigated. To ensure the results from such analysis are from the evidence and not from possible background within the laboratory, a baseline of the environment must be known.

Experimental

Samples were collected with Nomex wipes, purchased from Smiths Detection, and used as-is. The particle collection efficiency of this material has been previously measured by our laboratory and has been demonstrated to be adequate for the collection of trace residues off a variety of surfaces.[4] A total of 3 samples were provided for analysis. Upon receipt, samples were stored at -10 °C until they were processed.

Prior to analysis, wipes were trimmed in size to remove the unused area. The trimmed wipe was placed in a 10 mL amber glass vial and extracted with 4.0 mL of methanol (Omnisolv grade, Sigma-Aldrich). A 2.0 mL aliquot of the extract was removed and evaporated to dryness. The dried aliquot was reconstituted in 200 µL of acetonitrile.

Screening of Drugs by DART-MS

Screening was completed by dipping a glass microcapillary rod into a solution and analyzing it by direct analysis in real time mass spectrometry (DART-MS). A JEOL AccuTOF JMS T100-LP time-of-flight MS (JEOL USA) coupled with a DART ion source (Bruker Daltonics) was used. A 400 °C DART gas temperature, +50 V DART exit grid voltage, and helium source gas were used. The mass spectrometer was operated in positive ionization mode with a +800 V peaks voltage, +5 V orifice 2 and ring lens voltage, and a mass scan range of *m/z* 80 to *m/z* 800. To obtain molecular ion and fragmentation spectra, the orifice 1 voltage was cycled between +30 V and +60 V.

PEG-600 was used as a mass calibrant and AB-FUBINACA was used as a mass drift compensation compound. The resulting mass spectra were searched against an in-house created library of over 1,300 compounds using the NIST DART-MS Data Interpretation Tool. Compound identification required the following identification criteria: the protonated molecular ion or base peak of the compound must be present at greater than 5 % relative abundance and within ±5 mmu of the calculated accurate mass.

Results

None of the samples (Table 1) were found to contain a detectable level of any compound in the DART-MS screening method.

Table 1. Locations of samples collected.

Sample #	Location	Sample #	Location
R-8	Bay 5 counter R of hood 5	R-15	Hood 4 lower frame lip
R-10	Hood 5 lower frame lip		

Disclaimer

Certain commercial equipment, instruments, or materials are identified in this document. Such identification does not imply recommendation or endorsement by the National Institute of Standards and Technology, nor does it imply that the products identified are necessarily the best available for the purpose.

References

1. Daughton, C. G. Illicit Drugs and the Environment. in *Illicit Drugs in the Environment* (eds. Castiglioni, S., Zuccato, E. & Fanelli, R.) 1–27 (John Wiley & Sons, Inc., 2011).

2. Forbes, T. P. & Najarro, M. Ion mobility spectrometry nuisance alarm threshold analysis for illicit narcotics based on environmental background and a ROC-curve approach. *Analyst* **141,** 4438–4446 (2016).

3. Sisco, E. *et al.* Rapid detection of fentanyl, fentanyl analogues, and opioids for on-site or laboratory based drug seizure screening using thermal desorption DART-MS and ion mobility spectrometry. *Forensic Chem.* **4,** 108–115 (2017).

4. Verkouteren, J. R. *et al.* A method to determine collection efficiency of particles by swipe sampling. *Meas. Sci. Technol.* **19,** 115101 (2008).

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Mr. Russell Brown
Executive Director
Washington Association of Prosecuting Attorneys
rbrown@waprosecutors.org; WAPA_Notifications@waprosecutors.org

Date: October 16, 2024

Subject: 2024-TLD-02, 2024 Third Quarter NIST Environmental Results

The Washington State Patrol Seattle Toxicology Laboratory continues its collaboration with NIST related to environmental sampling in forensic science facilities. Results from the third quarter 2024 environmental sampling[1] were received on October 4, 2024. Of the 25 surface samples submitted to NIST for analysis, ketamine was presumptively identified in three samples.

The third quarter 2024 samples were tested by DART-MS, with presumptive positive results reported only from a single analysis. The DART-MS identification does not confirm the presence of a compound, as no chromatographic separation is completed.[2]

The sample sites with presumptive positive results, and adjacent areas, were placed out of service on October 4, 2024, and were cleaned by laboratory personnel on October 10, 2024. Initial evaluation showed samplings from these general areas were included in 2023 quarterly samplings with no detected compounds, to include no detected ketamine. A targeted review of laboratory casework was completed. Ketamine is not routinely confirmed by the Laboratory and following the review of casework, there is no indication of impact to casework at this time.

A copy of the NIST results is attached and will be posted to the Toxicology Laboratory website: https://wsp.wa.gov/forensics/toxicology.htm.

For any questions or further information, please contact the Seattle Toxicology Laboratory at toxlab@wsp.wa.gov.

Sincerely,

Elizabeth Gough
Division Commander
Toxicology Laboratory Division

Attachment

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[1] Samples were collected on September 5, 2024.
[2] October 4, 2024, Drug Background Quantitation & Screening Summary (Results, Page 3).

October 16, 2024

Quarterly Environmental Sampling – Drug Background Quantitation & Screening Summary Report

The Toxicology Laboratory continues its collaboration with NIST. NIST provides the Laboratory with test kits, which the Laboratory uses to collect environmental samples, and the samples are sent to NIST for testing.

In accordance with the Seattle Laboratory's quarterly environmental sampling schedule, a representative of the Washington State Patrol's Safety and Wellness Team collected samples on 09/05/2024, which the Laboratory sent to NIST for analysis. A summary of testing performed by NIST is attached, with test results listed on page 3 of the report. Of the 25 samples submitted for analysis, three samples (identified as Samples #8, #10 and #15) had ketamine presumptively identified by DART-MS.

NIST testing previously included initial analysis by DART-MS followed by a second targeted analysis by LC-MS/MS. On October 4, 2024, the Laboratory learned that the NIST LC-MS/MS method is currently in the process of revalidation and this set of samples (third quarter 2024) were only screened by DART-MS. As noted on page 3 of the report, DART-MS identification does not confirm the presence of a compound, as no chromatographic separation is completed. Since the LC-MS/MS targeted analysis was not performed, the presumptive positive was not confirmed using a targeted, chromatographic technique.

The sample sites with presumptive positive results, and adjacent areas, were placed out of service on October 4, 2024, and were cleaned by laboratory personnel on October 10, 2024. Follow-up sample collection from those areas using NIST test kits was completed on October 10, 2024 and samples were sent to NIST for analysis.

The next regularly scheduled full round of environmental sampling is planned for the fourth quarter of 2024.

October 4th, 2024

Kari O'Neill
Laboratory Manager
Washington State Patrol
2203 Airport Way South
Seattle, WA 98134

Kari,

Thank you for participating in our study. The following report contains results for the 25 samples collected by the Washington State Toxicology Laboratory in September 2024. The goal of this project was to establish the narcotics background present in a forensic science laboratory. The analysis scheme involved a broad screening of over 1,300 drugs and common excipients.

We would be happy to discuss these results in further detail with you at any time and hope to continue collaborative efforts in the future. If we can be of any assistance to you, please don't hesitate to ask.

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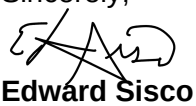

Edward Sisco

Research Chemist
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Drug Background Quantitation & Screening Summary

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Given that trace amounts of illicit drugs have been reported in a variety of environments, including public spaces,[2] and that instruments continue to improve in sensitivity, it is important to monitor environmental background levels of these compounds. For field and/or screening applications, establishing the background is key to setting instrument detection thresholds and preventing false positives.[3] This is especially critical in environments where there is an expected higher background level such as prisons or border crossings. In a laboratory setting, high environmental background levels can suggest a need to monitor background for data quality and personnel health purposes.

Finally, since forensic laboratories continue to struggle with a high number of emerging drug cases and rising backlogs, opportunities for rapid screening / presumptive testing are desired. The ability to screen evidence in a high throughput manner with little to no sample preparation is currently being investigated. To ensure the results from such analysis are from the evidence and not from possible background within the laboratory, a baseline of the environment must be known.

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PEG-600 was used as a mass calibrant and AB-FUBINACA was used as a mass drift compensation compound. The resulting mass spectra were searched against an in-house created library of over 1,300 compounds using the NIST DART-MS Data Interpretation Tool. Compound identification required the following identification criteria: the protonated molecular ion or base peak of the compound must be present at greater than 5 % relative abundance and within ±5 mmu of the calculated accurate mass.

Results

Ketamine was presumptively identified in Sample # 8, Sample # 10, and Sample # 15 (Table 1). It should be noted that DART-MS identifications do not confirm the presence of a compound, as no chromatographic separation is completed.

None of the remaining 22 samples (Table 1) were found to contain a detectable level of any compound in the DART-MS screening method.

Table 1. Locations of samples collected.

Sample #	Location	Sample #	Location
1	Bay 6 counter right of hood 6	14	Hood 4 knobs left side
2	Bay 6 counter by phone	15	Hood 4 lower frame lip
3	Bay 6 counter left of hood 6	16	Bay 3 counter left of hood 3
4	Hood 6 knobs on left side	17	Bay 3 counter by phone
5	Hood 6 lower frame lip	18	Bay 3 counter right of hood 3
6	Bay 5 counter left of hood 5	19	Hood 3 knobs left side
7	Bay 5 counter by window	20	Hood 3 lower frame lip
8	Bay 5 counter right of hood 5	21	Bay 2 counter right of hood 2
9	Hood 5 knob left side	22	Bay 2 counter farthest left side of hood 2 by sink
10	Hood 5 lower frame lip	23	Bay 2 counter left side of hood 2
11	Bay 4 counter right of hood 4	24	Hood 2 knobs left side
12	Bay 4 counter by window	25	Hood 2 lower frame lip
13	Bay 4 counter left of hood 4		

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References

1. Daughton, C. G. Illicit Drugs and the Environment. in *Illicit Drugs in the Environment* (eds. Castiglioni, S., Zuccato, E. & Fanelli, R.) 1–27 (John Wiley & Sons, Inc., 2011).

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