# Comprehensive LC/MS Analysis of Opiates, Opioids, Benzodiazepines, Amphetamines, Illicits, and Metabolites in Urine for Forensic Toxicology

## Application Note


### Abstract

This application note demonstrates that the Agilent 6420 Triple Quadrupole LC/MS system can be used to analyze a wide variety of drug classes in urine samples with minimal sample preparation while providing sufficient sensitivity, quantitative linearity, and accuracy.

Performance measures including limit of quantitation and accuracy are presented for a wide variety of analytes. Extensive testing of the instrumentation substantiates method robustness. Linearity for all analytes described in this application note show an $R^2 \geq 0.980$ and the batch analyses were repeated five times to obtain this preliminary data.



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## Introduction

This application note for forensic toxicology illustrates the use of LC/MS/MS in the simultaneous quantitation of more than 65 drug compounds referenced in Table 1. Compound classes analyzed in this method include amphetamines, analgesics, benzodiazepines, and opiates, in addition to other compounds and certain metabolites of interest.

Herein, we describe a forensic method for the rapid and targeted quantitation of a comprehensive suite of compounds in urine samples using LC/MS/MS. This method routinely surpasses forensic toxicology sensitivity requirements, often down to 10 % of the desired lower limit of quantification (LLOQ), while displaying excellent linearity and reproducibility. One of the key components of this method is the use of dynamic multiple reaction monitoring (dMRM)[1], which allows the LC/MS/MS instrument to analyze a higher number of analytes in a given time frame without compromising data integrity. In doing so, we are able to develop a highly comprehensive analyte method that is capable of faster throughput than that achieved using a traditional MRM method.

## Experimental

### Analytes

Table 1. Drugs and metabolites analyzed.

| Opiates/Opioids | Benzodiazepines | Stimulants |
|---|---|---|
| 6-Monoacetyl morphine | 2-Hydroxyethylflurazepam | Benzoylecgonine |
| Buprenorphine | 7-Aminoclonazepam | Cocaethylene |
| Codeine | 7-Aminoflunitrazepam | Cocaine |
| Dihydrocodeine | $\alpha$-Hydroxymidazolam | Methylphenidate |
| EDDP | Alprazolam | *m*-Hydroxybenzoylecgonine |
| Fentanyl | $\alpha$-Hydroxyalprazolam | Ritalinic acid |
| Heroin | $\alpha$-Hydroxytriazolam | Amphetamine |
| Hydrocodone | Chlordiazepoxide | Fenfluramine |
| Hydromorphone | Clonazepam | MDA |
| Meperidine | Desalkylflurazepam | MDEA |
| Methadone | Diazepam | MDMA |
| Morphine | Flunitrazepam | Meprobamate |
| Naloxone | Flurazepam | Methamphetamine |
| Naltrexone | Lorazepam | Phentermine |
| N-desmethyltramadol | Midazolam | Zopiclone |
| Norbuprenorphine | Nitrazepam | |
| Norfentanyl | Nordiazepam | |
| Normeperidine | Oxazepam | Others |
| Norpropoxyphene | Temazepam | Carisoprodol |
| *o*-Desmethyltramadol | Triazolam | PCP |
| Oxycodone | | Trazodone |
| Oxymorphone | | Verapamil |
| Propoxyphene | | Zolpidem |
| Tapentadol | | |
| Tramadol | | |

## LC/MS/MS configurations and conditions

The LC/MS/MS system used in this study consisted of the following modules: an Agilent 1260 Infinity Binary Pump, an Agilent 1260 Infinity Thermostatted Column Compartment, an Agilent 1260 Infinity Thermostatted Autosampler, an Agilent 6420 Triple Quadrupole LC/MS equipped with a standard ESI source, and MassHunter Quantitative Analysis Software B.05.00. LC and MS/MS conditions are shown in Table 2.

Table 2. LC and MS/MS conditions.

| LC conditions | | |
|---|---|---|
| Column | Agilent Poroshell 120 EC C18, 2.1 × 100 mm, 2.7 µm | |
| Column temperature | 55 °C | |
| Injection volume | 5 µL | |
| Needle wash | flush port, 100 % methanol, 5 seconds | |
| Buffer A | 5 mM ammonium formate + 0.01 % formic acid in water | |
| Buffer B | 0.01 % formic acid in methanol | |
| Flow rate | 0.5 mL/min | |
| Stop time | 6.0 minutes | |
| Post time | 1.5 minutes | |
| Gradient | Time (min) | %B |
| | 0.00 | 10 |
| | 0.50 | 15 |
| | 3.00 | 50 |
| | 4.00 | 95 |
| | 6.00 | 95 |
| Total run time | 7.5 minutes (This analysis time can be vastly reduced by using an Agilent 1290 Infinity LC system) | |
| **MS/MS conditions** | | |
| Ion mode | electrospray, positive | |
| Gas temperature | 350 °C | |
| Gas flow | 12 L/min | |
| Nebulizer | 50 psi | |
| Capillary voltage | 2,000 V | |
| Δ EMV | 0 V | |
| Dwell time | Variable (dynamic MRM) | |

## Method development with dMRM

When analyzing such a large panel of targets, developing traditional MRM methods can be challenging. As the number of simultaneously monitored MRM transitions increases, dwell time limitations emerge, adversely impacting data quality. dMRM methods provide an ideal solution to this challenge by assigning individual time windows to each transition and only monitoring transitions for compounds during the compound's elution window. Another important aspect of the dMRM approach is that MS cycle times are kept constant to ensure optimized sampling and consistently accurate quantitation.[1]

A custom dMRM method was quickly created by importing MRM transitions from the Agilent Forensic/Toxicology Database, which contains optimized parameters for multiple MRM transitions for over 200 compounds. Table 3 shows an excerpt of the dMRM table generated.

## Chemicals and reagents

All standards and labeled internal standards were purchased from Cerilliant, Round Rock, TX. Drug-free human urine was purchased from Golden West Biologicals, Temecula, CA. All other LC/MS grade solvents and reagents were purchased from Sigma-Aldrich, St. Louis, MO.

## Sample preparation

Calibrators were prepared by spiking drug-free human urine with 1,000 ng/mL of all 65 compounds listed in Table 1. Serial two-fold dilutions were used to achieve the remaining standard calibrator concentrations.

A mixture of labeled internal standards was added to all samples. Samples then underwent an enzymatic hydrolysis followed by a 10x dilution using water. Samples were transferred to 96-well plates and injected onto the 6420 Triple Quadrupole LC/MS/MS system.

## Data analysis

MassHunter Quantitative Analysis software (B.05.00) was used for data analysis. A $1/x^2$ weighting factor was applied during linear regression of the calibration curves. Quantitation using MassHunter Quantitative Analysis software was performed by MRM peak area ratio to a known concentration of the internal standards.

Table 3. Excerpt of dMRM table.

| Compound name | Prec ion | MS1 res | Prod ion | MS2 res | Frag (V) | CE (V) | RT | RT window |
|---|---|---|---|---|---|---|---|---|
| Oxymorphone | 302.1 | Unit | 284.0 | Unit | 117 | 17 | 0.80 | 0.5 |
| Oxymorphone | 302.1 | Unit | 227.0 | Unit | 117 | 29 | 0.80 | 0.5 |
| Morphine | 286.2 | Unit | 165.1 | Unit | 158 | 41 | 0.85 | 0.7 |
| Morphine | 286.2 | Unit | 152.0 | Unit | 158 | 60 | 0.85 | 0.7 |
| Hydromorphone | 286.2 | Unit | 185.0 | Unit | 159 | 29 | 1.04 | 0.7 |
| Hydromorphone | 286.2 | Unit | 157.0 | Unit | 159 | 45 | 1.04 | 0.7 |
| Codeine | 300.2 | Unit | 165.1 | Unit | 158 | 45 | 1.77 | 0.5 |
| Codeine | 300.2 | Unit | 58.1 | Unit | 158 | 29 | 1.77 | 0.5 |
| Naloxone | 328.2 | Unit | 310.0 | Unit | 91 | 17 | 1.81 | 0.5 |
| Naloxone | 328.2 | Unit | 211.9 | Unit | 91 | 41 | 1.81 | 0.5 |
| Oxycodone | 316.2 | Unit | 298.1 | Unit | 143 | 17 | 1.91 | 0.5 |
| Oxycodone | 316.2 | Unit | 256.1 | Unit | 143 | 25 | 1.91 | 0.5 |
| Naltrexone | 342.2 | Unit | 324.0 | Unit | 117 | 21 | 1.99 | 0.5 |
| Naltrexone | 342.2 | Unit | 55.0 | Unit | 117 | 41 | 1.99 | 0.5 |
| Hydrocodone | 300.2 | Unit | 199.0 | Unit | 159 | 29 | 2.05 | 0.5 |
| Hydrocodone | 300.2 | Unit | 128.0 | Unit | 159 | 65 | 2.05 | 0.5 |
| 6-Monoacetyl morphine | 328.2 | Unit | 165.1 | Unit | 158 | 41 | 2.07 | 0.5 |
| 6-Monoacetyl morphine | 328.2 | Unit | 43.1 | Unit | 158 | 60 | 2.07 | 0.5 |
| *d*-Amphetamine | 136.1 | Unit | 119.1 | Unit | 66 | 5 | 2.18 | 0.5 |
| *d*-Amphetamine | 136.1 | Unit | 91.0 | Unit | 66 | 17 | 2.18 | 0.5 |
| Methamphetamine | 150.1 | Unit | 119.0 | Unit | 92 | 5 | 2.27 | 0.5 |
| Methamphetamine | 150.1 | Unit | 91.0 | Unit | 92 | 17 | 2.27 | 0.5 |
| MDMA | 194.1 | Unit | 163.0 | Unit | 97 | 9 | 2.28 | 0.5 |
| MDMA | 194.1 | Unit | 105.0 | Unit | 97 | 25 | 2.28 | 0.5 |

## Results and Discussion

The chromatography conditions as outlined in the experimental section yield good chromatographic peak shape and separation for all analytes with a total analysis time of 6 minutes. An important chromatographic factor was to obtain good baseline separation for the isobaric analytes in this comprehensive suite. This was achieved for morphine/hydromorphone, codeine/hydrocodone and methamphetamine/phentermine using the chromatography conditions outlined in Table 2. Figure 1 shows an overlaid chromatogram that illustrates this using a matrix spiked sample of all analytes together with the corresponding isotopically labeled internal standards.

Calibrators were prepared by spiking drug-free human urine with a stock solution of the 65 compounds listed in Table 1, and their concentrations ranged from 1 to 10,000 ng/mL. An independently prepared stock solution was used to make quality control (QC) samples, in which three levels were prepared at 5, 100, and 750 ng/mL. Calibrators and QC were run in triplicate on three separate days to assess accuracy and reproducibility. All compounds showed accuracies between 90 and 110 % and coefficient of variation (CV) values less than 10 % (Table 4). Calibration curves showed excellent linearity over a wide range of concentrations (Figure 2). The LLOQ for each of the compounds analyzed can be found in Table 5.

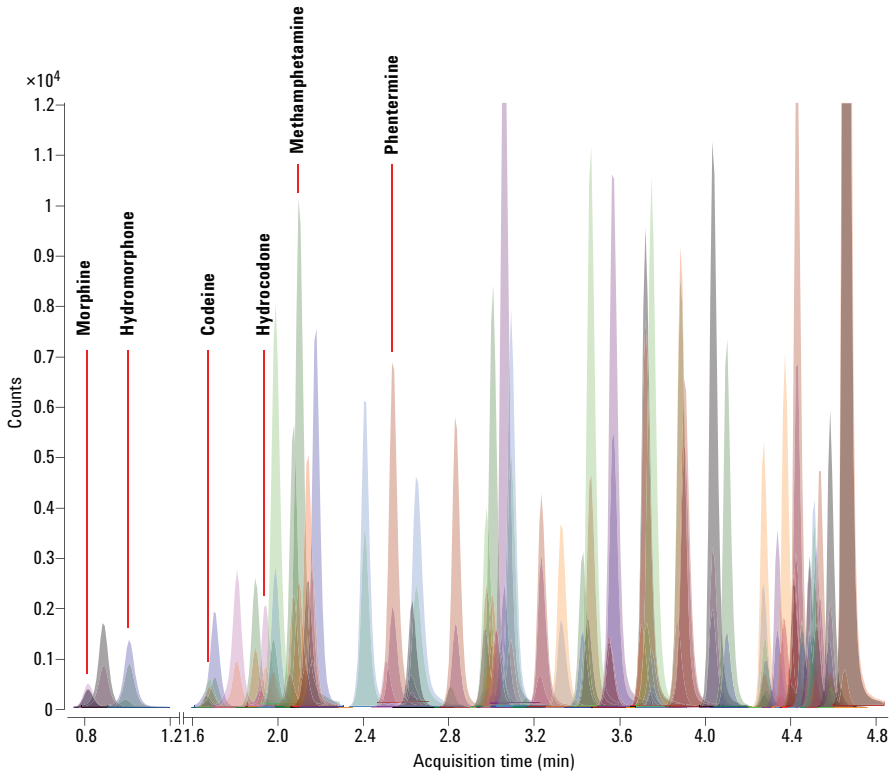


Figure 1. Chromatograph for 65 drugs and metabolites in a single run.

Table 4. Representative intraday and interday accuracy and precision for various drug compounds analyzed in urine; analytes were present at 100 ng/mL.

| | Intraday (n = 3) | | Interday (n = 9) | |
|---|---|---|---|---|
| | Ave accuracy (%) | CV (%) | Ave accuracy (%) | CV (%) |
| Buprenorphine | 95.9 | 3.7 | 97.9 | 5.7 |
| Carisoprodol | 92.5 | 5.4 | 97.6 | 4.8 |
| EDDP | 97.3 | 2.9 | 96.2 | 3.0 |
| Hydrocodone | 96.8 | 3.5 | 98.4 | 7.5 |
| Hydromorphone | 96.8 | 1.9 | 96.6 | 4.9 |
| Methadone | 94.3 | 2.1 | 90.4 | 3.3 |
| Morphine | 101.2 | 3.8 | 99.9 | 3.1 |
| Oxycodone | 100.8 | 3.1 | 95.3 | 7.8 |
| Oxymorphone | 95.3 | 7.0 | 98.4 | 2.6 |
| Propoxyphene | 95.6 | 5.5 | 91.9 | 2.8 |

The robustness of the method was tested by making 3,000 sequential injections and monitoring the retention times of several analytes across the entire chromatographic run. All analytes showed a variation of less than 1 % (Table 6).

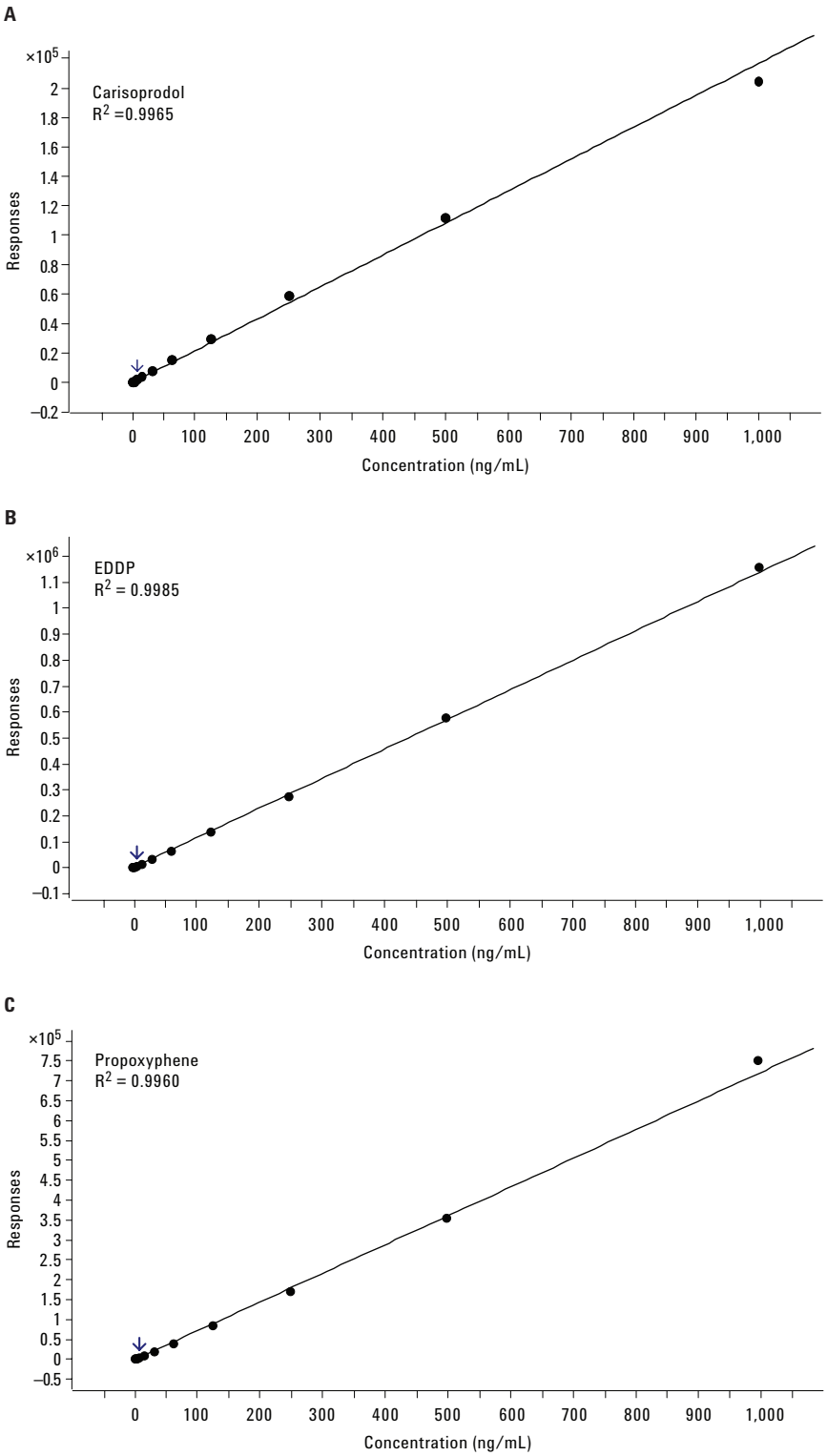


Figure 2. Representative calibration curves for carisoprodol (A) , EDDP (B), and propoxyphene (C).

Table 5. LLOQs for various drugs and metabolites.

| Opiates/Opioids | | Benzodiazepines | | Stimulants | |
|---|---|---|---|---|---|
| Compound | LLOQ | Compound | LLOQ | Compound | LLOQ |
| 6-Monoacetyl morphine | 10 | 2-OH-Ethylflurazepam | 200 | Amphetamine | 5 |
| Buprenorphine | 10 | 7-Aminoclonazepam | 10 | Benzoylecgonine | 5 |
| Codeine | 25 | 7-Aminoflunitrazepam | 5 | Cocaethylene | 5 |
| Dihydrocodeine | 25 | *alpha*-OH-Midazolam | 10 | Cocaine | 5 |
| EDDP | 10 | Alprazolam | 10 | Fenfluramine | 1 |
| Fentanyl | 1 | *a*-OH-alprazolam | 20 | MDA | 5 |
| Heroin | 10 | *a*-OH-triazolam | 50 | MDEA | 1 |
| Hydrocodone | 10 | Chlordiazepoxide | 10 | MDMA | 5 |
| Hydromorphone | 5 | Clonazepam | 25 | Meprobamate | 10 |
| Meperidine | 5 | Desalkylflurazepam | 20 | Methamphetamine | 1 |
| Methadone | 10 | Diazepam | 10 | Methylphenidate | 5 |
| Morphine | 5 | Flunitrazepam | 10 | m-Hydroxybenzoylecgonine | 10 |
| Naloxone | 5 | Flurazepam | 5 | Phentermine | 1 |
| Naltrexone | 10 | Lorazepam | 50 | Ritalinic acid | 5 |
| N-Desmethyltramadol | 10 | Midazolam | 10 | Zopiclone | 5 |
| Norbuprenorphine | 25 | Nitrazepam | 25 | Others | |
| Norfentanyl | 1 | Nordiazepam | 25 | Compound | LLOQ |
| Normeperidine | 5 | Oxazepam | 50 | Carisoprodol | 5 |
| Norpropoxyphene | 5 | Temazepam | 25 | PCP | 1 |
| *o*-Desmethyltramadol | 5 | Triazolam | 5 | Trazodone | 1 |
| Oxycodone | 10 | | | Verapamil | 2 |
| Oxymorphone | 5 | | | Zolpidem | 5 |
| Propoxyphene | 5 | | | | |
| Tapentadol | 5 | | | | |
| Tramadol | 1 | | | | |

Table 6. Snapshot of retention time reproducibility over 3,000 injections on a single column.

| Analyte | % CV | Analyte | % CV | Analyte | % CV |
|---|---|---|---|---|---|
| Morphine | 0.7 | Meperidine | 0.4 | Triazolam | 0.0 |
| Codeine | 0.4 | Zolpidem | 0.3 | Naltrexone | 0.1 |
| Hydrocodone | 0.4 | Fentanyl | 0.1 | Chlordiazepoxide | 0.1 |
| MDMA | 0.3 | EDDP | 0.1 | Desmethyl diazepam | 0.1 |
| Norfentanyl | 0.2 | Nitrazepam | 0.1 | Buprenorphine | 0.3 |
| Heroin | 0.2 | Propoxephine | 0.1 | Cocaethylene | 0.2 |
| Methylphenidate | 0.2 | Buprenorphine | 0.3 | 11-nor-9-carboxy-Δ9-THC | 0.0 |

## Conclusions

An analytical method for the quantitation of 65 drugs and metabolites in human urine has been developed using the Agilent 6420 Triple Quadrupole LC/MS. The development of analytical methods, ranging from custom to comprehensive, is quick and easy using the Agilent Forensic/Toxicology Database. The Agilent dynamic MRM approach ensures accurate and reproducible quantitation with this type of analysis.

This application note used a comprehensive panel of compounds to demonstrate the ultimate functionality of dynamic MRM and operational quality of the Agilent system. A wide selection of analyte components and their isotopically labelled internal standards can be analyzed in 6 minutes. Smaller and more focused panels of analytes could reduce the analysis time and enhance sample throughput significantly.

All typical detection limits under these extreme acquisition conditions were met, with all analytes exhibiting better than 98 % accuracy for each respective linear range. Detection limits were measured conservatively by using signal-to-noise determinations along with %CV precision data for the lesser abundant qualifier ions associated with each analyte.

Future investigations will compare and contrast the sample preparation technique of dilute and shoot with other techniques such as solid phase extraction (SPE).

## Reference

1. New Dynamic MRM Mode Improves Data Quality and Triple Quad Quantification in Complex Analyses. Agilent Publication 5990-3595EN.

## Appendix A – MRM Transitions for All Analytes and ISTDs

| Cpd name | ISTD? | Prec ion MS1 res | Prod ion MS2 res | Frag (V) | CE (V) | Cell acc (V) | Ret time (min) | Ret window | Polarity |
|---|---|---|---|---|---|---|---|---|---|
| 11-nor-9-carboxy-Δ9-THC | No | 345.2, Unit/Enh (6490) | 327.2 Unit/Enh (6490) | 140 | 18 | 7 | 5.01 | 0.5 | Positive |
| 11-nor-9-carboxy-Δ9-THC | No | 345.2 Unit/Enh (6490) | 299 Unit/Enh (6490) | 140 | 18 | 7 | 5.01 | 0.5 | Positive |
| 11-nor-9-carboxy-Δ9-THC-d9 | Yes | 354.1 Unit/Enh (6490) | 336.1 Unit/Enh (6490) | 136 | 13 | 7 | 5 | 0.5 | Positive |
| 11-nor-9-carboxy-Δ9-THC-d9 | Yes | 354.1 Unit/Enh (6490) | 308.2 Unit/Enh (6490) | 136 | 17 | 7 | 5 | 0.5 | Positive |
| 2-OH-Ethylflurazepam | No | 333.1 Unit/Enh (6490) | 211 Unit/Enh (6490) | 126 | 37 | 7 | 4.44 | 0.5 | Positive |
| 2-OH-Ethylflurazepam | No | 333.1 Unit/Enh (6490) | 109.1 Unit/Enh (6490) | 126 | 29 | 7 | 4.44 | 0.5 | Positive |
| 6-Acetylmorphine-d6 | Yes | 334.2 Unit/Enh (6490) | 211 Unit/Enh (6490) | 168 | 25 | 7 | 1.9 | 0.5 | Positive |
| 6-Monoacetyl morphine | No | 328.2 Unit/Enh (6490) | 165.1 Unit/Enh (6490) | 158 | 41 | 7 | 1.95 | 0.5 | Positive |
| 6-Monoacetyl morphine | No | 328.2 Unit/Enh (6490) | 43.1 Unit/Enh (6490) | 158 | 60 | 7 | 1.95 | 0.5 | Positive |
| 7-Aminoclonazepam | No | 286.1 Unit/Enh (6490) | 222.1 Unit/Enh (6490) | 141 | 25 | 7 | 3.01 | 0.5 | Positive |
| 7-Aminoclonazepam | No | 286.1 Unit/Enh (6490) | 121.1 Unit/Enh (6490) | 141 | 29 | 7 | 3.01 | 0.5 | Positive |
| 7-Aminoclonazepam-d4 | Yes | 290.1 Unit/Enh (6490) | 121.1 Unit/Enh (6490) | 151 | 33 | 7 | 2.98 | 0.5 | Positive |
| 7-Aminoflunitrazepam | No | 284.1 Unit/Enh (6490) | 227 Unit/Enh (6490) | 151 | 25 | 7 | 3.42 | 0.5 | Positive |
| 7-Aminoflunitrazepam | No | 284.1 Unit/Enh (6490) | 135.1 Unit/Enh (6490) | 151 | 25 | 7 | 3.42 | 0.5 | Positive |
| *alpha*-Hydroxyalprazolam | No | 325.1 Unit/Enh (6490) | 297 Unit/Enh (6490) | 150 | 28 | 7 | 4.38 | 0.5 | Positive |
| *alpha*-Hydroxyalprazolam | No | 325.1 Unit/Enh (6490) | 216 Unit/Enh (6490) | 150 | 41 | 7 | 4.38 | 0.5 | Positive |
| *alpha*-Hydroxyethylflurazepam | No | 333.1 Unit/Enh (6490) | 211 Unit/Enh (6490) | 155 | 37 | 7 | 4.44 | 0.5 | Positive |
| *alpha*-Hydroxyethylflurazepam | No | 333.1 Unit/Enh (6490) | 109 Unit/Enh (6490) | 155 | 29 | 7 | 4.44 | 0.5 | Positive |
| *alpha*-Hydroxymidazolam | No | 342.1 Unit/Enh (6490) | 324.1 Unit/Enh (6490) | 148 | 21 | 7 | 4.51 | 0.5 | Positive |
| *alpha*-Hydroxymidazolam | No | 342.1 Unit/Enh (6490) | 168.1 Unit/Enh (6490) | 148 | 45 | 7 | 4.51 | 0.5 | Positive |
| *alpha*-Hydroxytriazolam | No | 359.1 Unit/Enh (6490) | 331 Unit/Enh (6490) | 169 | 29 | 7 | 4.34 | 0.5 | Positive |
| *alpha*-Hydroxytriazolam | No | 359.1 Unit/Enh (6490) | 176 Unit/Enh (6490) | 169 | 29 | 7 | 4.34 | 0.5 | Positive |
| Alprazolam | No | 309.1 Unit/Enh (6490) | 281 Unit/Enh (6490) | 179 | 25 | 7 | 4.5 | 0.5 | Positive |

| Cpd name | ISTD? | Prec ion MS1 res | Prod ion MS2 res | Frag (V) | CE (V) | Cell acc (V) | Ret time (min) | Ret window | Polarity |
|---|---|---|---|---|---|---|---|---|---|
| Alprazolam | No | 309.1 Unit/Enh (6490) | 205 Unit/Enh (6490) | 179 | 49 | 7 | 4.5 | 0.5 | Positive |
| Alprazolam-d5 | Yes | 314.1 Unit/Enh (6490) | 286.1 Unit/Enh (6490) | 166 | 25 | 7 | 4.48 | 0.5 | Positive |
| Benzoylecgonine | No | 290.1Unit/Enh (6490) | 168.1 Unit/Enh (6490) | 118 | 17 | 7 | 2.64 | 0.5 | Positive |
| Benzoylecgonine | No | 290.1Unit/Enh (6490) | 77 Unit/Enh (6490) | 118 | 60 | 7 | 2.64 | 0.5 | Positive |
| Benzoylecgonine-d8 | Yes | 298.2 Unit/Enh (6490) | 171.1 Unit/Enh (6490) | 124 | 17 | 7 | 2.59 | 0.5 | Positive |
| Buprenorphine | No | 468.3 Unit/Enh (6490) | 396.2 Unit/Enh (6490) | 200 | 41 | 7 | 4.51 | 0.5 | Positive |
| Buprenorphine | No | 468.3 Unit/Enh (6490) | 55.1 Unit/Enh (6490) | 200 | 60 | 7 | 4.51 | 0.5 | Positive |
| Buprenorphine-d4 | Yes | 472.3 Unit/Enh (6490) | 59.2 Unit/Enh (6490) | 198 | 57 | 7 | 4.39 | 0.5 | Positive |
| Carisoprodol | No | 261.2 Unit/Enh (6490) | 176.1 Unit/Enh (6490) | 67 | 5 | 7 | 4.4 | 0.5 | Positive |
| Carisoprodol | No | 261.2 Unit/Enh (6490) | 55.1 Unit/Enh (6490) | 67 | 29 | 7 | 4.4 | 0.5 | Positive |
| Carisoprodol-d7 | Yes | 268.2 Unit/Enh (6490) | 183.1 Unit/Enh (6490) | 72 | 5 | 7 | 4.39 | 0.5 | Positive |
| Chlordiazepoxide | No | 300.1 Unit/Enh (6490) | 282.1 Unit/Enh (6490) | 117 | 21 | 7 | 4.53 | 0.5 | Positive |
| Chlordiazepoxide | No | 300.1 Unit/Enh (6490) | 227 Unit/Enh (6490) | 117 | 21 | 7 | 4.53 | 0.5 | Positive |
| Chlordiazepoxide-d5 | Yes | 305.1 Unit/Enh (6490) | 286.1 Unit/Enh (6490) | 124 | 25 | 7 | 4.51 | 0.5 | Positive |
| Clonazepam | No | 316.1 Unit/Enh (6490) | 270.1 Unit/Enh (6490) | 158 | 25 | 7 | 4.27 | 0.5 | Positive |
| Clonazepam | No | 316.1 Unit/Enh (6490) | 214 Unit/Enh (6490) | 158 | 41 | 7 | 4.27 | 0.5 | Positive |
| Clonazepam-d4 | Yes | 320.1 Unit/Enh (6490) | 274 Unit/Enh (6490) | 136 | 25 | 7 | 4.26 | 0.5 | Positive |
| Cocaethylene | No | 318.2 Unit/Enh (6490) | 196.1 Unit/Enh (6490) | 123 | 17 | 7 | 3.45 | 0.5 | Positive |
| Cocaethylene | No | 318.2 Unit/Enh (6490) | 82.1 Unit/Enh (6490) | 123 | 33 | 7 | 3.45 | 0.5 | Positive |
| Cocaethylene-d8 | Yes | 326.2 Unit/Enh (6490) | 204.1 Unit/Enh (6490) | 126 | 17 | 7 | 3.38 | 0.5 | Positive |
| Cocaine | No | 304.2 Unit/Enh (6490) | 182.1 Unit/Enh (6490) | 138 | 17 | 7 | 2.98 | 0.5 | Positive |
| Cocaine | No | 304.2 Unit/Enh (6490) | 77 Unit/Enh (6490) | 138 | 61 | 7 | 2.99 | 0.5 | Positive |
| Cocaine-d3 | Yes | 307.2 Unit/Enh (6490) | 185.1 Unit/Enh (6490) | 129 | 17 | 7 | 2.93 | 0.5 | Positive |
| Codeine | No | 300.2 Unit/Enh (6490) | 165.1 Unit/Enh (6490) | 158 | 45 | 7 | 1.67 | 0.5 | Positive |
| Codeine | No | 300.2 Unit/Enh (6490) | 128 Unit/Enh (6490) | 158 | 60 | 7 | 1.67 | 0.5 | Positive |
| Codeine-d6 | Yes | 306.2 Unit/Enh (6490) | 218.1 Unit/Enh (6490) | 151 | 25 | 7 | 1.58 | 0.5 | Positive |
| *d*-Amphetamine | No | 136.1 Unit/Enh (6490) | 119.1 Unit/Enh (6490) | 66 | 5 | 7 | 1.96 | 0.5 | Positive |
| *d*-Amphetamine | No | 136.1 Unit/Enh (6490) | 91 Unit/Enh (6490) | 66 | 17 | 7 | 1.96 | 0.5 | Positive |
| Desalkylflurazepam | No | 289.1 Unit/Enh (6490) | 226 Unit/Enh (6490) | 131 | 29 | 7 | 4.48 | 0.5 | Positive |
| Desalkylflurazepam | No | 289.1 Unit/Enh (6490) | 140 Unit/Enh (6490) | 131 | 29 | 7 | 4.48 | 0.5 | Positive |
| Desmethyl diazepam | No | 271.1 Unit/Enh (6490) | 165 Unit/Enh (6490) | 189 | 29 | 7 | 4.58 | 0.5 | Positive |

| Cpd name | ISTD? | Prec ion MS1 res | Prod ion MS2 res | Frag (V) | CE (V) | Cell acc (V) | Ret time (min) | Ret window | Polarity |
|---|---|---|---|---|---|---|---|---|---|
| Desmethyl diazepam | No | 271.1 Unit/Enh (6490) | 140 Unit/Enh (6490) | 189 | 29 | 7 | 4.58 | 0.5 | Positive |
| Diazepam | No | 285.1 Unit/Enh (6490) | 193.1 Unit/Enh (6490) | 131 | 33 | 7 | 4.65 | 0.5 | Positive |
| Diazepam | No | 285.1 Unit/Enh (6490) | 154 Unit/Enh (6490) | 131 | 25 | 7 | 4.65 | 0.5 | Positive |
| Diazepam-d5 | Yes | 290.1 Unit/Enh (6490) | 198.1 Unit/Enh (6490) | 131 | 33 | 7 | 4.64 | 0.5 | Positive |
| Dihydrocodeine | No | 303.2 Unit/Enh (6490) | 200.1 Unit/Enh (6490) | 136 | 33 | 7 | 1.64 | 0.5 | Positive |
| Dihydrocodeine | No | 303.2 Unit/Enh (6490) | 129.1 Unit/Enh (6490) | 136 | 65 | 7 | 1.64 | 0.5 | Positive |
| EDDP | No | 278.2 Unit/Enh (6490) | 234.1 Unit/Enh (6490) | 158 | 33 | 7 | 4.02 | 0.5 | Positive |
| EDDP | No | 278.2 Unit/Enh (6490) | 219.1 Unit/Enh (6490) | 158 | 45 | 7 | 4.02 | 0.5 | Positive |
| EDDP-d3 | Yes | 281.2 Unit/Enh (6490) | 234.1 Unit/Enh (6490) | 168 | 29 | 7 | 3.96 | 0.5 | Positive |
| Fenfluramine | No | 232.1 Unit/Enh (6490) | 159 Unit/Enh (6490) | 104 | 21 | 7 | 3.55 | 0.5 | Positive |
| Fenfluramine | No | 232.1 Unit/Enh (6490) | 109 Unit/Enh (6490) | 104 | 45 | 7 | 3.55 | 0.5 | Positive |
| Fenfluramine-d10 | Yes | 242.2 Unit/Enh (6490) | 161 Unit/Enh (6490) | 114 | 25 | 7 | 3.48 | 0.5 | Positive |
| Fentanyl | No | 337.2 Unit/Enh (6490) | 188.1 Unit/Enh (6490) | 143 | 21 | 7 | 3.86 | 0.5 | Positive |
| Fentanyl | No | 337.2 Unit/Enh (6490) | 105.1 Unit/Enh (6490) | 143 | 41 | 7 | 3.86 | 0.5 | Positive |
| Fentanyl-d5 | Yes | 342.3 Unit/Enh (6490) | 188.1 Unit/Enh (6490) | 146 | 21 | 7 | 3.78 | 0.5 | Positive |
| Flunitrazepam | No | 314.1 Unit/Enh (6490) | 268.1 Unit/Enh (6490) | 153 | 25 | 7 | 4.33 | 0.5 | Positive |
| Flunitrazepam | No | 314.1 Unit/Enh (6490) | 239.1 Unit/Enh (6490) | 153 | 37 | 7 | 4.33 | 0.5 | Positive |
| Flurazepam | No | 388.2 Unit/Enh (6490) | 317.1 Unit/Enh (6490) | 158 | 17 | 7 | 4.08 | 0.5 | Positive |
| Flurazepam | No | 388.2 Unit/Enh (6490) | 315 Unit/Enh (6490) | 158 | 21 | 7 | 4.08 | 0.5 | Positive |
| Heroin | No | 370.2 Unit/Enh (6490) | 268.1 Unit/Enh (6490) | 149 | 37 | 7 | 2.97 | 0.5 | Positive |
| Heroin | No | 370.2 Unit/Enh (6490) | 165 Unit/Enh (6490) | 149 | 61 | 7 | 2.97 | 0.5 | Positive |
| Heroin-d9 | Yes | 379.2 Unit/Enh (6490) | 61.2 Unit/Enh (6490) | 168 | 29 | 7 | 2.9 | 0.5 | Positive |
| Hydrocodone | No | 300.2 Unit/Enh (6490) | 199 Unit/Enh (6490) | 159 | 29 | 7 | 1.92 | 0.5 | Positive |
| Hydrocodone | No | 300.2 Unit/Enh (6490) | 128 Unit/Enh (6490) | 159 | 65 | 7 | 1.92 | 0.5 | Positive |
| Hydrocodone-d6 | Yes | 306.2 Unit/Enh (6490) | 202.1 Unit/Enh (6490) | 161 | 29 | 7 | 1.85 | 0.5 | Positive |
| Hydromorphone | No | 286.2 Unit/Enh (6490) | 185 Unit/Enh (6490) | 159 | 29 | 7 | 0.97 | 0.5 | Positive |
| Hydromorphone | No | 286.2 Unit/Enh (6490) | 157 Unit/Enh (6490) | 159 | 45 | 7 | 0.98 | 0.5 | Positive |
| hydromorphone-d6 | Yes | 292.2 Unit/Enh (6490) | 185 Unit/Enh (6490) | 166 | 33 | 7 | 0.95 | 0.5 | Positive |
| Lorazepam | No | 321 Unit/Enh (6490) | 303 Unit/Enh (6490) | 124 | 9 | 7 | 4.43 | 0.5 | Positive |
| Lorazepam | No | 321 Unit/Enh (6490) | 275 Unit/Enh (6490) | 124 | 17 | 7 | 4.43 | 0.5 | Positive |
| MDA | No | 180.1 Unit/Enh (6490) | 163 Unit/Enh (6490) | 61 | 5 | 7 | 2.04 | 0.5 | Positive |

| Cpd name | ISTD? | Prec ion MS1 res | Prod ion MS2 res | Frag (V) | CE (V) | Cell acc (V) | Ret time (min) | Ret window | Polarity |
|---|---|---|---|---|---|---|---|---|---|
| MDA | No | 180.1 Unit/Enh (6490) | 105 Unit/Enh (6490) | 61 | 21 | 7 | 2.04 | 0.5 | Positive |
| MDA-d5 | Yes | 185.1 Unit/Enh (6490) | 168.1 Unit/Enh (6490) | 87 | 5 | 7 | 1.98 | 0.5 | Positive |
| MDEA | No | 208.1 Unit/Enh (6490) | 163 Unit/Enh (6490) | 107 | 9 | 7 | 2.39 | 0.5 | Positive |
| MDEA | No | 208.1 Unit/Enh (6490) | 105 Unit/Enh (6490) | 107 | 25 | 7 | 2.39 | 0.5 | Positive |
| MDMA | No | 194.1 Unit/Enh (6490) | 163 Unit/Enh (6490) | 97 | 9 | 7 | 2.12 | 0.5 | Positive |
| MDMA | No | 194.1 Unit/Enh (6490) | 105 Unit/Enh (6490) | 97 | 25 | 7 | 2.12 | 0.5 | Positive |
| MDMA-d5 | Yes | 199.1 Unit/Enh (6490) | 165 Unit/Enh (6490) | 82 | 9 | 7 | 2.06 | 0.5 | Positive |
| Meperidine | No | 248.2 Unit/Enh (6490) | 220.1 Unit/Enh (6490) | 128 | 21 | 7 | 3.21 | 0.5 | Positive |
| Meperidine | No | 248.2 Unit/Enh (6490) | 174.1 Unit/Enh (6490) | 128 | 17 | 7 | 3.21 | 0.5 | Positive |
| Meperidine-d4 | Yes | 252.2 Unit/Enh (6490) | 224.1 Unit/Enh (6490) | 141 | 17 | 7 | 3.15 | 0.5 | Positive |
| Meprobamate | No | 219.1 Unit/Enh (6490) | 158.1 Unit/Enh (6490) | 65 | 5 | 7 | 3.54 | 0.5 | Positive |
| Meprobamate | No | 219.1 Unit/Enh (6490) | 55.1 Unit/Enh (6490) | 65 | 21 | 7 | 3.54 | 0.5 | Positive |
| Methadone | No | 310.2 Unit/Enh (6490) | 265.1 Unit/Enh (6490) | 112 | 9 | 7 | 4.42 | 0.5 | Positive |
| Methadone | No | 310.2 Unit/Enh (6490) | 105 Unit/Enh (6490) | 112 | 29 | 7 | 4.42 | 0.5 | Positive |
| Methadone-d9 | Yes | 319.3 Unit/Enh (6490) | 268.1 Unit/Enh (6490) | 89 | 13 | 7 | 4.39 | 0.5 | Positive |
| Methamphetamine | No | 150.1 Unit/Enh (6490) | 91 Unit/Enh (6490) | 92 | 17 | 7 | 2.07 | 0.5 | Positive |
| Methamphetamine | No | 150.1 Unit/Enh (6490) | 65.1 Unit/Enh (6490) | 92 | 45 | 7 | 2.07 | 0.5 | Positive |
| Methylphenidate | No | 234.1 Unit/Enh (6490) | 84.1 Unit/Enh (6490) | 112 | 21 | 7 | 3.04 | 0.5 | Positive |
| Methylphenidate | No | 234.1 Unit/Enh (6490) | 56.1 Unit/Enh (6490) | 112 | 53 | 7 | 3.04 | 0.5 | Positive |
| Methylphenidate-d9 | Yes | 243.2 Unit/Enh (6490) | 93.2 Unit/Enh (6490) | 109 | 21 | 7 | 2.97 | 0.5 | Positive |
| *m*-Hydroxybenzoylecgonine | No | 306.1 Unit/Enh (6490) | 168 Unit/Enh (6490) | 124 | 17 | 7 | 2.14 | 0.5 | Positive |
| *m*-Hydroxybenzoylecgonine | No | 306.1 Unit/Enh (6490) | 121 Unit/Enh (6490) | 124 | 33 | 7 | 2.14 | 0.5 | Positive |
| Midazolam | No | 326.1 Unit/Enh (6490) | 291.1 Unit/Enh (6490) | 194 | 29 | 7 | 4.57 | 0.5 | Positive |
| Midazolam | No | 326.1 Unit/Enh (6490) | 249.1 Unit/Enh (6490) | 194 | 41 | 7 | 4.57 | 0.5 | Positive |
| Midazolam-d4 | Yes | 330.1 Unit/Enh (6490) | 295.1 Unit/Enh (6490) | 156 | 29 | 7 | 4.54 | 0.5 | Positive |
| Morphine | No | 286.2 Unit/Enh (6490) | 165.1 Unit/Enh (6490) | 158 | 41 | 7 | 0.79 | 0.5 | Positive |
| Morphine | No | 286.2 Unit/Enh (6490) | 152 Unit/Enh (6490) | 158 | 60 | 7 | 0.79 | 0.5 | Positive |
| Morphine-d6 | Yes | 292.2 Unit/Enh (6490) | 152 Unit/Enh (6490) | 173 | 65 | 7 | 0.72 | 0.5 | Positive |
| Naloxone | No | 328.2 Unit/Enh (6490) | 310.1 Unit/Enh (6490) | 129 | 17 | 7 | 1.68 | 0.5 | Positive |
| Naloxone | No | 328.2 Unit/Enh (6490) | 212 Unit/Enh (6490) | 129 | 41 | 7 | 1.68 | 0.5 | Positive |
| Naltrexone | No | 342.2 Unit/Enh (6490) | 324.1 Unit/Enh (6490) | 126 | 17 | 7 | 1.87 | 0.5 | Positive |
| Naltrexone | No | 342.2 Unit/Enh (6490) | 55.1 Unit/Enh (6490) | 126 | 41 | 7 | 1.87 | 0.5 | Positive |
| N-Desmethyltramadol | No | 250.2 Unit/Enh (6490) | 232.1 Unit/Enh (6490) | 92 | 5 | 7 | 3.14 | 0.5 | Positive |
| N-Desmethyltramadol | No | 250.2 Unit/Enh (6490) | 121 Unit/Enh (6490) | 92 | 33 | 7 | 3.14 | 0.5 | Positive |

| Cpd name | ISTD? | Prec ion MS1 res | Prod ion MS2 res | Frag (V) | CE (V) | Cell acc (V) | Ret time (min) | Ret window | Polarity |
|---|---|---|---|---|---|---|---|---|---|
| Nitrazepam | No | 282.1 Unit/Enh (6490) | 236.1 Unit/Enh (6490) | 148 | 25 | 7 | 4.27 | 0.5 | Positive |
| Nitrazepam | No | 282.1 Unit/Enh (6490) | 180 Unit/Enh (6490) | 148 | 41 | 7 | 4.27 | 0.5 | Positive |
| Nitrazepam-d5 | Yes | 287.1 Unit/Enh (6490) | 241.1 Unit/Enh (6490) | 151 | 25 | 7 | 4.24 | 0.5 | Positive |
| Norbuprenorphine | No | 414.3 Unit/Enh (6490) | 101.1 Unit/Enh (6490) | 188 | 41 | 7 | 3.74 | 0.5 | Positive |
| Norbuprenorphine | No | 414.3 Unit/Enh (6490) | 83.1 Unit/Enh (6490) | 188 | 53 | 7 | 3.74 | 0.5 | Positive |
| Norcodeine | No | 286.2 Unit/Enh (6490) | 268.1 Unit/Enh (6490) | 143 | 17 | 7 | 0.79 | 0.5 | Positive |
| Norcodeine | No | 286.2 Unit/Enh (6490) | 165.1 Unit/Enh (6490) | 143 | 45 | 7 | 0.79 | 0.5 | Positive |
| Nordiazepam | No | 271.1 Unit/Enh (6490) | 165 Unit/Enh (6490) | 138 | 25 | 7 | 4.58 | 0.5 | Positive |
| Nordiazepam | No | 271.1 Unit/Enh (6490) | 140 Unit/Enh (6490) | 138 | 29 | 7 | 4.58 | 0.5 | Positive |
| Norfentanyl | No | 233.2 Unit/Enh (6490) | 84.1 Unit/Enh (6490) | 97 | 13 | 7 | 2.82 | 0.5 | Positive |
| Norfentanyl | No | 233.2 Unit/Enh (6490) | 55.1 Unit/Enh (6490) | 97 | 37 | 7 | 2.81 | 0.5 | Positive |
| Norfentanyl-d5 | Yes | 238.2 Unit/Enh (6490) | 84.1 Unit/Enh (6490) | 114 | 17 | 7 | 2.74 | 0.5 | Positive |
| Norfludiazepam | No | 289.1 Unit/Enh (6490) | 226.1 Unit/Enh (6490) | 117 | 25 | 7 | 4.48 | 0.5 | Positive |
| Norfludiazepam | No | 289.1 Unit/Enh (6490) | 140.1 Unit/Enh (6490) | 117 | 29 | 7 | 4.48 | 0.5 | Positive |
| Normeperidine | No | 234 Unit/Enh (6490) | 160 Unit/Enh (6490) | 81 | 13 | 7 | 3.29 | 0.5 | Positive |
| Normeperidine | No | 234 Unit/Enh (6490) | 56 Unit/Enh (6490) | 81 | 21 | 7 | 3.29 | 0.5 | Positive |
| Norpropoxyphene | No | 326.2 Unit/Enh (6490) | 252.2 Unit/Enh (6490) | 87 | 5 | 7 | 4.4 | 0.5 | Positive |
| Norpropoxyphene | No | 326.2 Unit/Enh (6490) | 91 Unit/Enh (6490) | 87 | 49 | 7 | 4.4 | 0.5 | Positive |
| *o*-Desmethyltramadol | No | 250.2 Unit/Enh (6490) | 232.1 Unit/Enh (6490) | 97 | 9 | 7 | 2.16 | 0.5 | Positive |
| *o*-Desmethyltramadol | No | 250.2 Unit/Enh (6490) | 58.1 Unit/Enh (6490) | 97 | 17 | 7 | 2.16 | 0.5 | Positive |
| Oxazepam | No | 287.1 Unit/Enh (6490) | 269 Unit/Enh (6490) | 114 | 21 | 7 | 4.43 | 0.5 | Positive |
| Oxazepam | No | 287.1 Unit/Enh (6490) | 241 Unit/Enh (6490) | 114 | 9 | 7 | 4.43 | 0.5 | Positive |
| Oxycodone | No | 316.2 Unit/Enh (6490) | 298.1 Unit/Enh (6490) | 143 | 17 | 7 | 1.8 | 0.5 | Positive |
| Oxycodone | No | 316.2 Unit/Enh (6490) | 241.1 Unit/Enh (6490) | 143 | 29 | 7 | 1.8 | 0.5 | Positive |
| Oxymorphone | No | 302.1 Unit/Enh (6490) | 284 Unit/Enh (6490) | 117 | 17 | 7 | 0.87 | 0.5 | Positive |
| Oxymorphone | No | 302.1 Unit/Enh (6490) | 227 Unit/Enh (6490) | 117 | 29 | 7 | 0.86 | 0.5 | Positive |
| PCP | No | 244.2 Unit/Enh (6490) | 91 Unit/Enh (6490) | 86 | 41 | 7 | 3.71 | 0.5 | Positive |
| PCP | No | 244.2 Unit/Enh (6490) | 86.1 Unit/Enh (6490) | 86 | 9 | 7 | 3.71 | 0.5 | Positive |
| PCP-d5 | Yes | 249.2 Unit/Enh (6490) | 86.1 Unit/Enh (6490) | 87 | 9 | 7 | 3.63 | 0.5 | Positive |
| Phentermine | No | 150.1 Unit/Enh (6490) | 91.1 Unit/Enh (6490) | 70 | 21 | 7 | 2.53 | 0.5 | Positive |
| Phentermine | No | 150.1 Unit/Enh (6490) | 65.1 Unit/Enh (6490) | 70 | 45 | 7 | 2.53 | 0.5 | Positive |
| Phentermine-d5 | Yes | 155.2 Unit/Enh (6490) | 96.1 Unit/Enh (6490) | 72 | 21 | 7 | 2.43 | 0.5 | Positive |
| Propoxyphene | No | 340.2 Unit/Enh (6490) | 266.2 Unit/Enh (6490) | 92 | 5 | 7 | 4.37 | 0.5 | Positive |

| Cpd name | ISTD? | Prec ion MS1 res | Prod ion MS2 res | Frag (V) | CE (V) | Cell acc (V) | Ret time (min) | Ret window | Polarity |
|---|---|---|---|---|---|---|---|---|---|
| Propoxyphene | No | 340.2 Unit/Enh (6490) | 58.1 Unit/Enh (6490) | 92 | 25 | 7 | 4.37 | 0.5 | Positive |
| propoxyphene-d5 | Yes | 345.3 Unit/Enh (6490) | 58.1 Unit/Enh (6490) | 87 | 17 | 7 | 4.32 | 0.5 | Positive |
| Ritalininc acid | No | 220.1 Unit/Enh (6490) | 84.1 Unit/Enh (6490) | 95 | 20 | 7 | 2.63 | 0.5 | Positive |
| Ritalininc acid | No | 220.1 Unit/Enh (6490) | 56.1 Unit/Enh (6490) | 95 | 41 | 7 | 2.63 | 0.5 | Positive |
| Tapentadol | No | 222.2 Unit/Enh (6490) | 107.1 Unit/Enh (6490) | 119 | 25 | 7 | 3.08 | 0.5 | Positive |
| Tapentadol | No | 222.2 Unit/Enh (6490) | 77.1 Unit/Enh (6490) | 119 | 57 | 7 | 3.08 | 0.5 | Positive |
| Tapentadol-d3 | Yes | 225.2 Unit/Enh (6490) | 107.1 Unit/Enh (6490) | 129 | 25 | 7 | 3.02 | 0.5 | Positive |
| Temazepam | No | 301.1 Unit/Enh (6490) | 255.1 Unit/Enh (6490) | 117 | 29 | 7 | 4.51 | 0.5 | Positive |
| Temazepam | No | 301.1 Unit/Enh (6490) | 177 Unit/Enh (6490) | 117 | 45 | 7 | 4.51 | 0.5 | Positive |
| tramadol-$^{13}$C-d3 | Yes | 268.2 Unit/Enh (6490) | 58.2 Unit/Enh (6490) | 104 | 17 | 7 | 2.9 | 0.5 | Positive |
| Trazodone | No | 372.2 Unit/Enh (6490) | 176 Unit/Enh (6490) | 159 | 25 | 7 | 3.89 | 0.5 | Positive |
| Trazodone | No | 372.2 Unit/Enh (6490) | 148 Unit/Enh (6490) | 159 | 37 | 7 | 3.89 | 0.5 | Positive |
| Triazolam | No | 343.1 Unit/Enh (6490) | 308.1Unit/Enh (6490) | 140 | 25 | 7 | 4.48 | 0.5 | Positive |
| Triazolam | No | 343.1 Unit/Enh (6490) | 239 Unit/Enh (6490) | 140 | 45 | 7 | 4.48 | 0.5 | Positive |
| Verapamil | No | 455.3 Unit/Enh (6490) | 165 Unit/Enh (6490) | 158 | 37 | 7 | 4.26 | 0.5 | Positive |
| Verapamil | No | 455.3 Unit/Enh (6490) | 150 Unit/Enh (6490) | 158 | 45 | 7 | 4.27 | 0.5 | Positive |
| Zolpidem | No | 308.2 Unit/Enh (6490) | 235.6 Unit/Enh (6490) | 156 | 25 | 7 | 3.74 | 0.5 | Positive |
| Zolpidem | No | 308.2 Unit/Enh (6490) | 235.1 Unit/Enh (6490) | 156 | 37 | 7 | 3.74 | 0.5 | Positive |
| Zolpidem-d6 | Yes | 314.2 Unit/Enh (6490) | 235.1 Unit/Enh (6490) | 168 | 37 | 7 | 3.61 | 0.5 | Positive |
| Zopiclone | No | 389.1 Unit/Enh (6490) | 245 Unit/Enh (6490) | 82 | 13 | 7 | 2.96 | 0.5 | Positive |
| Zopiclone | No | 389.1 Unit/Enh (6490) | 217 Unit/Enh (6490) | 82 | 33 | 7 | 2.96 | 0.5 | Positive |
| Zopiclone-d4 | Yes | 393.1 Unit/Enh (6490) | 217 Unit/Enh (6490) | 97 | 33 | 7 | 2.88 | 0.5 | Positive |

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