

Simplifying Sample Prep

THC Analyses by LC/MS and GC/MS



THC Analyses by LC/MS and GC/MS

Whole Blood, Urine, Oral Fluid, Hair, Serum/Plasma

Recreational marijuana use is currently legal in eleven U.S. states. Fourteen additional states have decriminalized marijuana, but have not legalized it.¹ It is increasingly important for laboratories to develop accurate testing methods for THC, and its related compounds, in biological matrices of those that may be driving or committing crimes under the influence of marijuana. Biotage provides simple and effective sample prep protocols for cleanup of blood, urine, and oral fluid samples that produce reliable results, and are automation compatible.



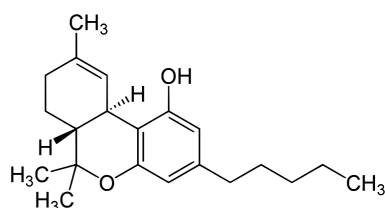
Common Matrices and Analytes

When testing for impairment of THC, it is important to determine the appropriate matrix to test. Testing of whole blood will indicate more recent use while testing of urine will indicate long-term use and/or use that was not as recent. However, it is important to know which metabolites to test for as well.

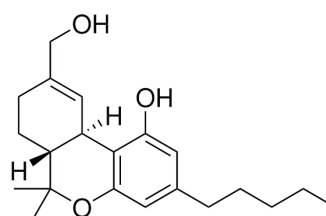


| Compound | pKa | logP | When to Analyze |
|---------------------|------------|------|--|
| THC (parent) | -4.9, 9.34 | 5.94 | Detectable in whole blood/plasma |
| THC-OH | -2.7, 9.34 | 5.78 | Minor metabolite of THC detectable in plasma and urine |
| THC-COOH | 4.2, 9.3 | 5.14 | Major metabolite of THC detectable in plasma and urine |
| CBD | 9.13 | 6.33 | Medical marijuana |
| CBG | 9.16 | 7.05 | Indicates use of marijuana |
| CBN | 9.32 | 6.41 | Degraded product of THC-COOH |

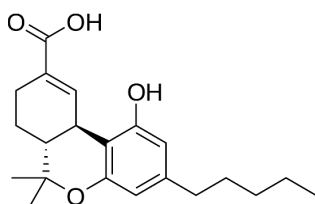
THC



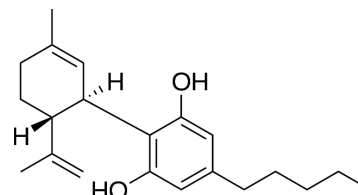
THC-OH



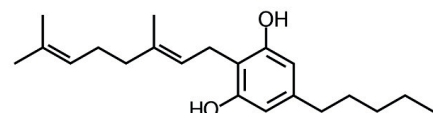
THC-COOH



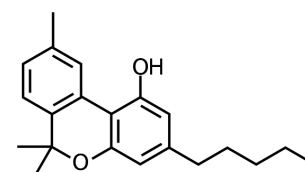
CBD



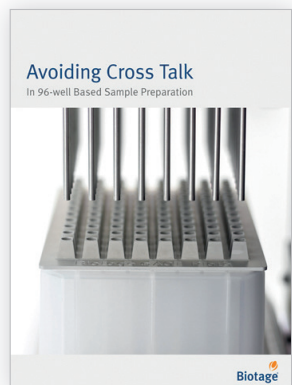
CBG



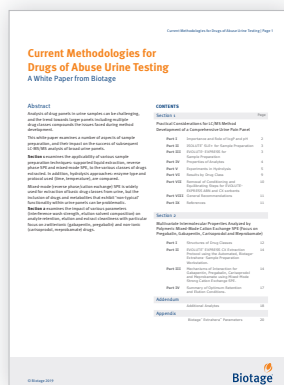
CBN



Download These Technical Guides from www.biotage.com



Avoiding cross contamination during evaporation of 96-well plates.
Literature part no. PPS387



Urine – White Paper.
Literature part no. PPS443



Oral Fluid – White Paper.
Literature part no. PPS476

Options for Extraction

Based on your method needs, both cartridges and plates are available to accommodate supported liquid extraction and solid phase extraction. The proven methodology for THC testing on each technique is outlined below.

ISOLUTE® SLE+

Supported Liquid Extraction using ISOLUTE® SLE+ allows for recovery of all cannabinoids listed.



Cannabinoids: ISOLUTE® SLE+ Method



1 Pre-treatment

Pre-treat sample with 1% formic acid to adjust the pH for optimal binding.



2 Load

Load buffered sample volume appropriate for the cartridge or plate chosen.



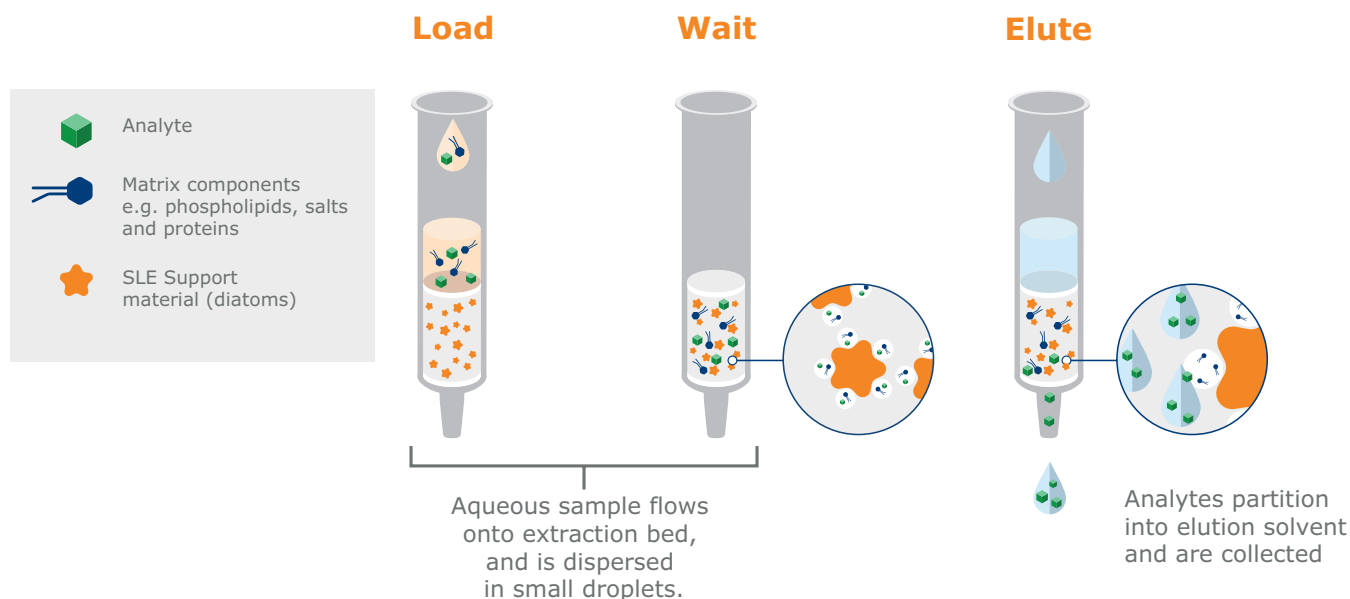
3 Wait

Let sit for 5 minutes



4 Elute

The cannabinoids are eluted with 2 aliquots of 30:70 Hexane/ ethyl acetate.
Evaporate and re-constitute as necessary for analysis.



EVOLUTE® EXPRESS AX

Solid phase extraction using EVOLUTE® EXPRESS AX can also be used to extract cannabinoids. This uses a mixed mode anion exchange to bind the cannabinoids to the sorbent bed.



Cannabinoids:

EVOLUTE® EXPRESS AX Method



1 Pre-treatment

Pre-treat sample with a basic buffer, like 0.1% ammonium hydroxide, to adjust the pH for optimal binding.



2 Load

Load buffered sample volume appropriate for the cartridge or plate chosen.



3 Wash

Wash with a basic buffer and an organic solvent like methanol.



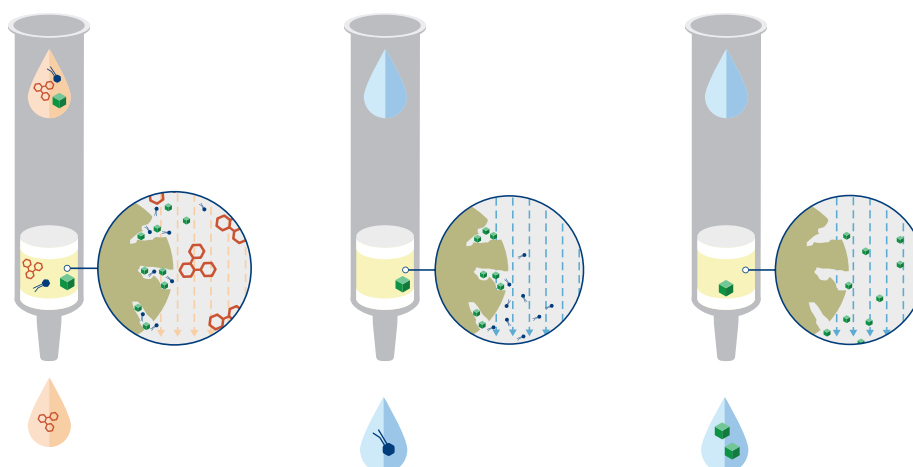
4 Elute

The cannabinoids are eluted with an acidic elution solvent (78:20:2 DCM/IPA/acetic acid)
Evaporate and re-constitute as necessary for analysis.

Load

Interference Elution

Analyte Elution



Download Technical Resources to Assist in your Method Development

THC

P198.v.1: A Simplified Sample Preparation for Low Level Determination of Cannabis Use from Hair Samples Prior to LC-MS/MS Analysis.

P195: Automated Extraction of 12 Drugs of Abuse from Human Breast Milk Using EVOLUTE® EXPRESS CX Prior to LC-MS/MS Analysis.

Synthetic Cathinones

P109: A Novel SLE-LDTD-MS/MS Method for the Screening of NBOMe Designer Drugs in Oral Fluid.

AN776: Extraction of Bath Salts (substituted cathinones) From Human Urine Using ISOLUTE® SLE+ Columns Prior to GC-MS Analysis.

AN808: Extraction of Designer Stimulants from Urine Using ISOLUTE® SLE+ Prior to GC/MS Analysis.

Synthetic Cannabinoids

Whole Blood

A new supported liquid extraction (SLE) strategy with liquid chromatography mass spectrometry detection for the determination of JWH018, JWH073, CP47, 497, CP47, -C8, JWH200, JWH019, HU210 and JWH250 in blood

AN793: Automated Extraction of Synthetic Cannabinoids (SPICE) from Urine Using ISOLUTE® SLE+ Prior to LC/MS/MS.

AN780: Extraction of Synthetic Cannabinoids from Hydrolyzed Urine Using ISOLUTE® SLE+ Prior to GC-MS Analysis.



GC/MS Methods

AN852 (Opiates): Extraction of Opiates from Whole Blood Using ISOLUTE® SLE+ Prior to GC/MS Analysis.

P138 (DOA) Evaluation of Drugs of Abuse Extraction from Whole Blood Using Supported Liquid Extraction (SLE) Prior to GC/MS Analysis.

AN864 (DOA, Pesticides) Extraction of Illicit Drugs and Pesticides from Liver Tissue Using ISOLUTE® SLE+ Prior to GC/MS Analysis.

AN841 (THC-COOH): Extraction of 11-nor-9-carboxy-tetrahydrocannabinol from Hydrolyzed Urine by ISOLUTE® SLE+ Prior to GC/MS Analysis.

AN827 (Amps): Extraction of Amphetamines and Metabolites from Urine (including Elimination of Sympathomimetic Amine Interferences) Using ISOLUTE® SLE+ Prior to GC/MS Analysis.

AN854: (Benzodiazepines) Extraction of Benzodiazepines from Whole Blood using ISOLUTE® SLE+ Prior to GC/MS Analysis.

And Many More!

General Processing Tips

P151: Evaluation of Novel Automated Sample Preparation Compared to Manual Processing in Forensic Toxicology.

To download a copy of any of the above technical resources please visit **www.biotage.com**

References

1. <https://www.usnews.com/news/best-states/articles/where-is-marijuana-legal-a-guide-to-marijuana-legalization>

Biotage® 1-Point Support™

You don't have to start from scratch.....

Our Application Chemists can help you

- » Achieve faster analysis by eliminating unnecessary steps
- » Save money by reducing solvent consumption
- » Improve your data accuracy and ruggedness

North America

Telephone: +1 704 654 4900

Toll free: +1 800 446 4752

Fax: +1 704 654 4917

E-mail: US-1-pointsupport@biotage.com



Your Complete Partner for Effective Chemistry

Biotage is a worldwide supplier of instruments and accessories designed to facilitate the work of laboratory and process chemists. With our deep knowledge of the industry, academic contacts and in-house R&D teams, we can deliver the best solutions to your challenges. We take great pride in our flexibility and ability to meet our customer's individual needs. With strong foundations in both analytical, organic and process chemistry, we can offer the widest range of solutions available on the market.

EUROPE

Main Office: +46 18 565900
Toll Free: +800 18 565710
Fax: +46 18 591922
Order Tel: +46 18 565710
Order Fax: +46 18 565705
order@biotage.com
Support Tel: +46 18 56 59 11
Support Fax: +46 18 56 57 11
eu-1-pointsupport@biotage.com

NORTH & LATIN AMERICA

Main Office: +1 704 654 4900
Toll Free: +1 800 446 4752
Fax: +1 704 654 4917
Order Tel: +1 704 654 4900
Order Fax: +1 434 296 8217
ordermailbox@biotage.com
Support Tel: +1 800 446 4752
Outside US: +1 704 654 4900
us-1-pointsupport@biotage.com

JAPAN

Tel: +81 3 5627 3123
Fax: +81 3 5627 3121
jp_order@biotage.com
jp-1-pointsupport@biotage.com

CHINA

Tel: +86 21 68162810
Fax: +86 21 68162829
cn_order@biotage.com
cn-1-pointsupport@biotage.com

KOREA

Tel: +82 31 706 8500
Fax: +82 31 706 8510
korea_info@biotage.com
kr-1-pointsupport@biotage.com

INDIA

Tel: +91 22 4005 3712
india@biotage.com

Distributors in other regions
are listed on www.biotage.com

Literature Number: PPS587

© 2019 Biotage. All rights reserved. No material may be reproduced or published without the written permission of Biotage. Information in this document is subject to change without notice and does not represent any commitment from Biotage. E&OE. A list of all trademarks owned by Biotage AB is available at www.biotage.com/legal. Other product and company names mentioned herein may be trademarks or registered trademarks and/or service marks of their respective owners, and are used only for explanation and to the owners' benefit, without intent to infringe.

