Advion

Cannabis Analysis

Integrated Solutions for Potency and Safety with the
expression Compact Mass Spectrometer and Solation ICP-MS

POTENT SOLUTIONS FOR YOUR BUDDING LAB

Advion.com/Cannabis · info@advion.com

Analysis for Cannabinoids and Contamination Measurements

Outfit your lab with Advion's line of custom cannabis solutions, including the expression® Compact Mass Spectrometer (CMS), the SOLATION ICP-MS, and a customizable (U)HPLC solution

Your Complete Lab Solution:

Advion provides integrated laboratory solutions for comprehensive cannabis testing, including potency testing and cannabinoid levels as well as pesticide measurement and quantitation of heavy metals.

expression CMS - Waste no time introducing your sample in to the mass spec with the expression CMS, offering the industry's widest range of sample introduction techniques in an easy-to-use, compact system.

SOLATION ICP-MS - Advion's ICP-MS provides fast, simple measurement of levels of toxic metals in a wide array of samples, including heavy metals in cannabis. Measure Arsenic, Cadmium, Lead and Mercury and more in plant material, extracts, oils and edibles.

Customizable HPLC & UHPLC - Advion's range of high performance, liquid chromatography systems can be used standalone with UV and UV/Vis detector options, or with the expression CMS to provide seamlessly integrated LC/CMS under the full control of Advion's simple, intuitive software suite.

Cannabis Sampling Solutions

Streamline your sample prep with these easy techniques from the expression® CMS

Plate Express: Push-Button Analysis of TLC Plates

With the Plate Express TLC plate reader, you can now use TLC plates to analyze cannabis samples in a fast, efficient way. With the Advion Plate Express you can:

- Analyze directly from TLC plates
- Identify spots in <1 minute
- Simplify the process of obtaining spectra - ideal for multi-user labs
- No scraping TLC spots

ASAP Direct Sample Probe - Results in < 30 Seconds

The ASAP probe requires no sample preparation, no chromatography, and provides sensitive analysis of the widest range of compounds in less than 30 seconds.

Ergonomically designed for work flow efficiency, the ASAP probe has a push-button grip and release to quickly pick up a glass capillary for fast assays. The capillary and sample holder provides even greater ease of use and maintains organization, even when running back-to-back samples - simply swipe and insert.

The Advion ASAP probe offers:

- Fast and affordable sample analysis
- No sample preparation
- No chromatography
- Solvent-free - green technique
- Analyzes a wide range of compounds

Cannabinoid Testing for Quality Control Using ASAP/CMS

High-Throughput Cannabinoid Testing Method for Cannabis Quality Control Using ASAP/CMS

ASAP/CMS provides a simple, sensitive and selective sample introduction approach to measure the presence of two isobaric compounds, CBDA and THCA, contained in a complex sample such as hemp or cannabis plants or their corresponding extraction products.

The expression CMS with ASAP probe provides:

- A method to determine the relative composition of CBDA and THCA in hemp and marijuana plants using the ion current abundance differences in their respective precursor/fragment ion transitions (*m/z* 341 to *m/z* 261).
- A simple, sensitive and selective sample technique.
- A simple, high-throughput screening approach to potentially differentiate hemp and marijuana or possibly other cannabis strains.

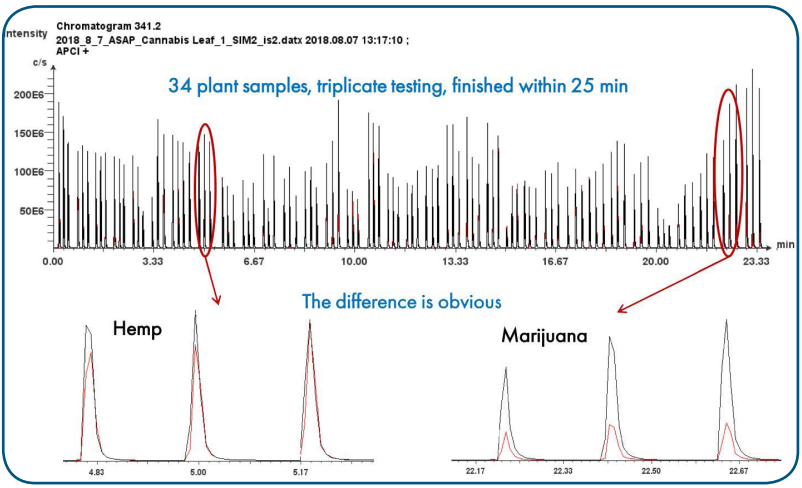


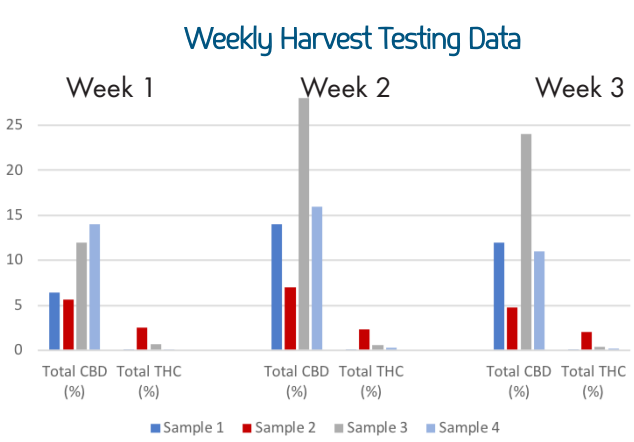
Figure: High-throughput screening (blind) for 34 different cannabis plants. These results show the use of ASAP/CMS to determine the relative composition of CBDA and THCA in the plants.

Optimize Your Harvest with Advion LC/CMS

LC/CMS provides fast, accurate, high throughput quantitative analysis

LC/CMS with selected ion monitoring (SIM) provides quantification of cannabinoids to help determine the optimal harvest timing. It is also used for measurement of pesticide levels.

- Use LC/CMS for CBDA, THCA, CBD, THC and CBN to determine when to harvest for optimal yield.

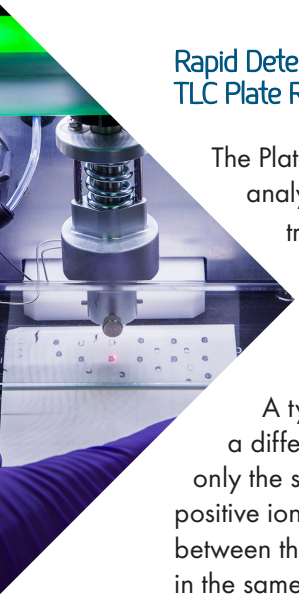


- Quantify pesticides using the LC/CMS testing method.

	Marijuana (No Spray) ppm*	Marijuana (Light Spray) ppm*	Marijuana (Heavy Spray) ppm*
Methomyl		4.71 ± 0.113	13.0 ± 0.179
Thiamethoxam		5.41 ± 0.056	13.2 ± 0.043
Imidacloprid	0.385 ± 0.014	7.07 ± 0.100	16.7 ± 0.416
Dimethoate		5.56 ± 0.021	14.7 ± 0.238
Acetamiprid	2.72 ± 0.059	5.74 ± 0.036	9.43 ± 0.144
Thiacloprid		4.50 ± 0.106	11.1 ± 0.282
Carbofuran		4.74 ± 0.061	11.9 ± 0.281
Ancymidol		3.58 ± 0.080	9.30 ± 0.515
Carbaryl		3.68 ± 0.313	9.40 ± 0.078
Chlorantraniliprole	0.182 ± 0.035	3.52 ± 0.030	8.84 ± 0.296
Azoxystrobin		3.15 ± 0.007	7.71 ± 0.169
Systhane	0.577 ± 0.016	5.37 ± 0.046	12.6 ± 0.187
Propiconazole	2.64 ± 0.048	5.54 ± 0.007	10.4 ± 0.158
Etoxazole		0.973 ± 0.011	3.82 ± 0.166
Fenpyroximate		3.92 ± 0.035	9.77 ± 0.120

*1 ppm = 1ng/mg of plant

Detecting CBN, CBD and THC Using Plate Express TLC/CMS



Rapid Detection of Cannabinoids with the Plate Express TLC Plate Reader:

The Plate Express TLC plate reader can provide push-button analysis of a TLC plate, extract the compounds present and transport them to the expression CMS for rapid analysis. The CMS offers a fast scan speed, on-line polarity switching and in-source CID, generating valuable information in the analysis of natural products.

A typical TLC/CMS analysis of THC is shown in A, B. Despite a different molecular structure, both THC and CBD have not only the same isotopic mass, but also fragment identically in positive ion mode ESI/CMS, which makes it difficult to distinguish between them. However, in negative ion mode, in-source CID results in the same *m/z* fragments, but at significantly different relative intensities which allows a distinction between them, shown in D.

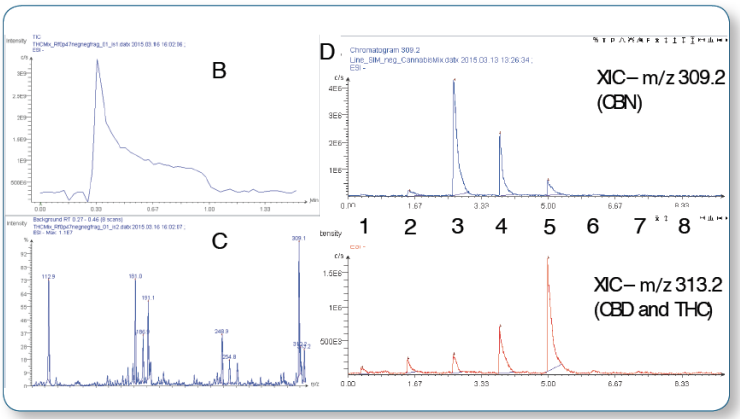


Figure: TLC/CMS analysis of cannabinoids. TLC/CMS analysis of the Rf region of THC (Rf=0.47) shows a strong MS TIC signal (B) with a prominent negative ion signal at *m/z* 313.2 (data not shown) and the characteristic in-source CID fragments of THC (C).

Detecting THC/Cannabinoids by ASAP/CMS

Direct Sample Analysis for Rapid Screening of Cannabinoids:

ASAP/CMS is a rapid mass spectral analysis approach that can screen a variety of samples and surfaces for the presence of cannabinoids

- Dried plant material can readily be screened for the presence of cannabinoids such as Cannabinol, THC/CBD or the acids THCA/CBDA
- Alternating acquisition of positive and negative ion mass spectra improves detection when sampling from complex samples such as skin contaminated with small quantities of plant material

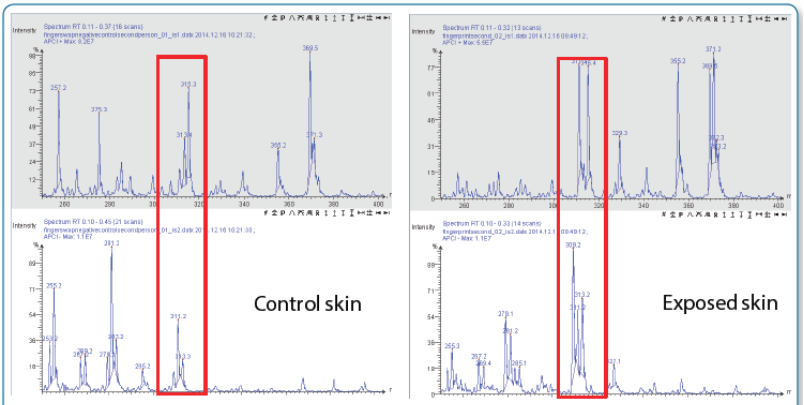


Figure 7: MS data showing both positive ionization (top trace) and negative ionization (bottom trace) of the ASAP finger skin analysis before and after cannabis exposure (control left side, exposed skin right side). The typical m/z signals at 311.2/309.1 and 315.2/313.2 are indicative of the respective $(M+H)^+$ and $(M-H)^-$ for Cannabinol and THC/CBD respectively.

Experience the Full Advion Suite

The expression family of compact mass spectrometers was developed with maximum versatility in mind. They allow users to switch rapidly between the many different sample introduction techniques required throughout an analyst's workflow; from simple direct probe analysis to ultra-high performance liquid chromatography and prep-scale purification. Now with the SOLATION ICP-MS, Advion provides a full elemental analysis for a robust family of cannabis analysis solutions.

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