ENHANCED VOLATILES ANALYSIS

OF TERPENES AND RESIDUAL SOLVENTS

USING HEADSPACE GAS CHROMATOGRAPHY

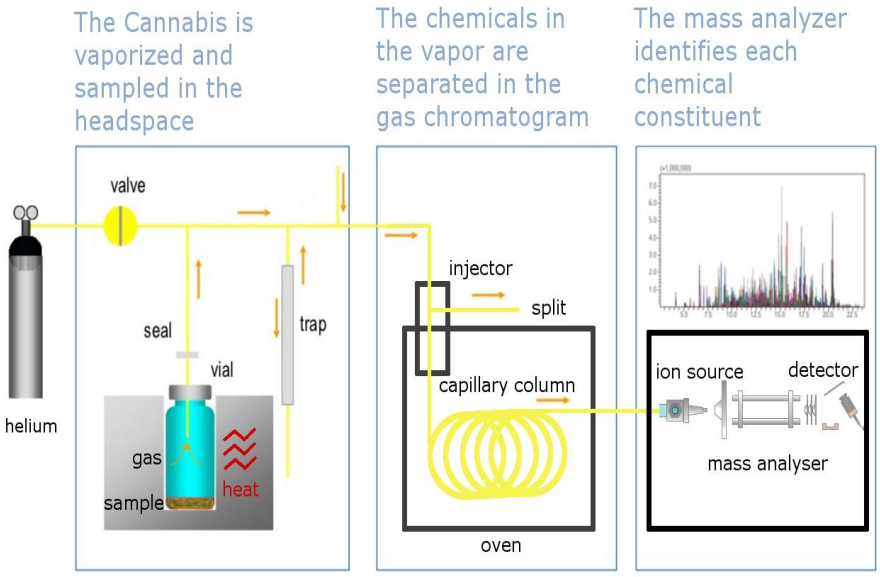
WITH MASS SPECTOMETRY

CONFIDENCE ANALYTICS PRESENTS

The Cutting Edge of *Cannabis* Product Volatiles Analysis

Gas chromatography with mass spectrometry has long been regarded as the ideal method for analysis of volatile compounds in a mixture. Gas chromatography (GC) is a technique very good at separating the constituents in a small puff of gas, able to separate each chemical constituent in a sample with high resolution. When coupled with mass spectrometry (MS) as a method of detection, the combined GC-MS can routinely separate, identify, and quantify many dozens (even hundreds) of volatile compounds in each sample, with gold-standard sensitivity and selectivity. Headspace sampling (HS) is a technique that draws a puff of sample gas by vaporizing the sample in an air-tight vial and giving a precise amount of that sample's head space to the GC.

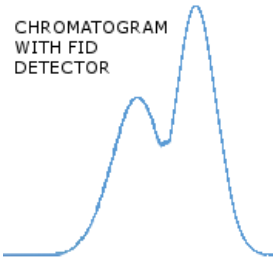
Clarus SQ8 GCMS System with TurboMatrix HS-110



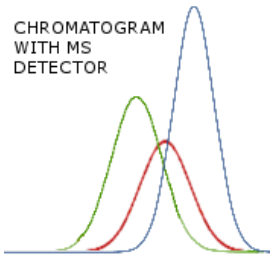
This combined HS-GC-MS is the ultimate way to analyze the volatile chemicals in cannabis samples: the sample is disturbed as little as possible before being analyzed, minimizing the loss of terpenes to the air and maximizing your terpene profile. Our scientists have developed a world-class analysis method using HS-GC-MS which can accurately identify and quantify every residual solvent in the recently updated I-502 guidelines, as well as a growing list of over 40 terpenes – **in only one analysis per sample.** Because we do not use a different analysis for residuals and terpenes, we can offer the best-in-class quality and accuracy that Confidence Analytics is known for at a very competitive price.

HOW IS HS-GC-MS DIFFERENT THAN WHAT OTHER LABS DO?

The most commonly used alternative to the MS detector is the flame ionization detector (FID). Unlike MS, which can distinguish between molecules based on their size and shape, the FID works by simply burning the sample as it exits the capillary column, and measures how much "stuff" is being burned. Thus, the FID chromatogram only has one trace, whereas the MS can trace individual compounds based on their mass spectra.

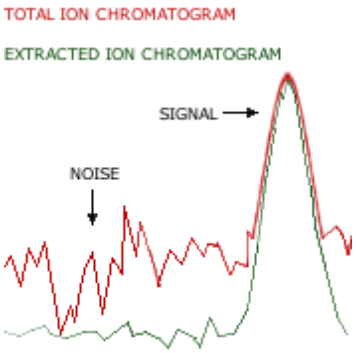


As you can see from the chromatograms to the right, the FID detector is unable to fully resolve the two biggest peaks and has missed the third peak entirely. This results in the FID failing to identify some of the compounds in the sample, and overestimating the peaks that it does identify. The MS, in contrast, has achieved resolution to baseline for all three compounds eluting in this window.



IMPROVED SENSITIVITY

Thanks to the tremendous power of the MS to discern between molecular ions of different masses, the instrument can achieve a much better signal to noise ratio than other detector types. This enables the MS to identify and quantify even the smallest peaks that would otherwise be buried in noise. By focusing on only the ions of interest, the MS provides superior sensitivity to trace-level compounds.



IMPROVED SELECTIVITY

The ability of MS to characterize a substance based on its spectrum of its mass fragments is what enables our assay to identify compounds with high certainty. Because MS is so well documented in literature, we can reference the mass spectra we see in samples to that of compounds in publicly available libraries. The Nation Institute of Standards and Technology (NIST) maintains a spectral library of nearly every compound known to man. To the right, the mass spectra of alpha-pinene as measured in a cannabis sample is compared to that of alpha-pinene in the NIST database, enabling us to confirm with high certainty that what we are seeing is, in fact, alpha-pinene.