Traditional GC/MS analyses and library searches involve simple routines based on large amounts of relatively pure substances. Unfortunately, this is not sufficient for analyzing multi-component samples – such as synthetic cannabinoids sprayed onto botanical mixtures. Conventionally these complex, emerging drugs must be identified and quantified manually, which is labor intensive and potentially inconsistent. This is unacceptable in forensic labs struggling with limited resources and higher operational costs – due, in part, to the rising price of helium.

Get application workflows up and running reliably from day one

Agilent Controlled Substance Analyzers are based on the Agilent 5977A MS with the 7890B GC. Each is factory pre-tested and pre-configured to save precious start-up time, optimize sample throughput, and balance your cost of operation with innovations such as:

• A thermal insulated oven insert that shortens cycle time to 13 minutes, compared to 21 minutes with conventional configurations
• The ability to use helium or hydrogen as a carrier gas
• An Ultra Inert flow path to ensure that target compounds reach the MS detector
• A Controlled Substances Database containing more than 460 compounds – including new psychoactive substances, such as synthetic cannabinoids and bath salts

Agilent Controlled Substance Analyzers reflect innovative technology, high chromatographic performance, and stringent quality control. Systems include:

Factory
• System setup and leak testing
• Application configuration
• Installation of appropriate columns/accessories
• Chemical performance verification with application-specific checkout mix

Delivery
• Instrument and method manuals
• CD-ROM with method parameters and checkout data files for easy out-of-the-box operation
• Application-related consumables included – no separate ordering required
• Easy consumables re-ordering information

Installation
• Duplicate factory checkout with checkout sample – onsite by factory-trained support engineer
• Optional application startup assistance
Technological advances improve performance and ensure consistent results between systems, operators, and labs

Producing data that stand up to legal scrutiny demands reproducible results throughout your laboratory network. You can improve data consistency — while increasing throughput and minimizing downtime — with the Agilent Controlled Substance Analyzer. It features:

- The choice of helium or hydrogen carrier gas to help your lab control operational costs
- Deconvolution Reporting Software (DRS) for fast data review in 2-3 minutes per sample, with screening and quantitation in one run
- Retention Time Locking (RTL) for consistent retention times after column maintenance and easy matching with the DRS Controlled Substances Database
- Capillary Flow Technology (CFT) and backflush that shorten run times, minimize chemical background, extend column life, and reduce frequency of source cleaning

Here’s the same separation, using DRS identification

You will notice that it reveals two peaks, separated by only 0.002 min. — less than 1 scan.

What makes DRS so unique?

DRS combines the power of three compound identification programs: MSD ChemStation, AMDIS 32, and NIST 09. Then, it confirms the targets using deconvoluted full spectra from AMDIS.

With the 3-in-one advantage of DRS, you can find targets that conventional data analysis can miss, with fewer false positives and negatives — and with less operator bias on data review.

With these powerful tools, the Controlled Substances Analyzer helps your operation increase productivity and profitability by improving sample throughput, reducing time for method and system maintenance, as well as reducing operator bias on data review.

### Table: AMDIS and NIST Comparison

<table>
<thead>
<tr>
<th>Retention Time (R.T.)</th>
<th>Cas #</th>
<th>Compound Names</th>
<th>Chemstation</th>
<th>AMDIS</th>
<th>Match</th>
<th>R.T. Diff</th>
<th>Reverse Match</th>
<th>Hit Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.2702</td>
<td>51769327</td>
<td>N-Propylamphetamine</td>
<td>99</td>
<td>1.3</td>
<td>91</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.6881</td>
<td>3158858</td>
<td>10,11-Dihydrodibenzo(b,f)(1,4)oxazepin-11-one</td>
<td>97</td>
<td>0.7</td>
<td>90</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.2479</td>
<td>521379</td>
<td>Cannabidiol</td>
<td>68</td>
<td>5.6</td>
<td>84</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.281</td>
<td>1972083</td>
<td>Delta-9-tetrahydrocannabinol (THC)</td>
<td>95</td>
<td>0.5</td>
<td>85</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.283</td>
<td>125291</td>
<td>Hydrocodone</td>
<td>95</td>
<td>0.2</td>
<td>88</td>
<td>1</td>
<td></td>
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<tr>
<td>5.3145</td>
<td>466999</td>
<td>Hydromorphone</td>
<td>78</td>
<td>0.1</td>
<td>67</td>
<td>2</td>
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<tr>
<td>5.3637</td>
<td>521357</td>
<td>Cannabis</td>
<td>67</td>
<td>0.8</td>
<td>55</td>
<td>4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In less than 60 seconds, DRS accurately identified both THC and Hydrocodone.
Compound identification: Probability-based matching (PBM) vs. Deconvolution Reporting Software (DRS)

When accuracy is critical and time precious, the choice is clear.

What compound elutes at 5.28 minutes? Probability-based matching identifies THC – but are you sure? The comparison below suggests a different answer.

PBM leaves you with uncertainty: This comparison of THC and Hydrocodone spectra against the collected spectrum reveals that the collected spectrum doesn’t quite match THC.
Our Analyzer solutions significantly reduce your time from system arrival to final validation. With pre-configured hardware and method-specific separation tools, your analysts can focus on calibration and validation per your laboratory’s SOPs.

Agilent has the technology and experience to support your lab with fully customized solutions

Bomb the box:
A full portfolio of customized products, advice, and support

High-quality columns and supplies from the world GC leader
Agilent-engineered GC columns and supplies deliver what your analysts demand — including:
• Long-term reliability and robustness
• Trouble-free instrument operation
• Faster analysis without loss of resolution

Best-in-class service and support — both on-site and remotely
Whether you need support for a single instrument or a large-scale, multi-vendor operation, Agilent service professionals can help you solve problems quickly and increase your uptime — so you can focus on what you do best.

Custom GC and GC/MS configurations
Let Agilent customize a standard GC or a GC/MS analyzer with specialized columns, valves, tubing inlets, and other add-ons — including an extensive line of consumables and column modules.

Ordering information:

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Analyzer Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>G3445B#472</td>
<td>Controlled Substance Analyzer - Helium Gas</td>
</tr>
<tr>
<td>G3445B#476</td>
<td>Controlled Substance Analyzer - Hydrogen Gas</td>
</tr>
</tbody>
</table>

* Both Analyzers easily convert between carrier gases *

Put your lab on the productivity fast track.
Contact your local Agilent Representative or Agilent Authorized Distributor at agilent.com/chem/contactus
Or call 800-227-9770 (in the U.S. or Canada)
Visit agilent.com/chem/appkits for a description of available Analyzers and Application Kits

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