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Don't overestimate cannabidiol during medical cannabis potency determinations with gas chromatography. Use stationary phase selectivity for accuracy and hydrogen for fast analysis.

February 17th, 2013 by [Jack Cochran](#)

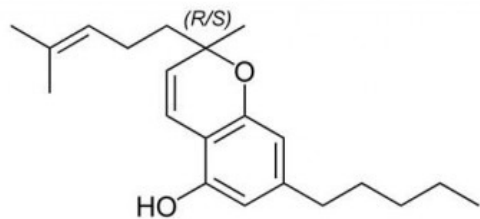
It's important to properly quantify cannabidiol in medical marijuana samples, as it is one of the chief cannabinoid compounds with pharmacological value, including relief against nausea, anxiety, and inflammation. However, on typically used "5 type" GC columns, it can coelute with cannabichromene, a compound that likely also has medical value and is more and more becoming part of potency testing. To determine both of these compounds accurately, a GC column with a different stationary phase can be used.

A good hint at what stationary phase might be best for cannabinoid analysis is seen in their structures below, in that all contain an aromatic piece. A non-aromatic stationary phase, like the [Rxi-1ms](#), which is 100% dimethyl polysiloxane, shows a coelution for cannabichromene (CBC) and cannabidiol (CBD). While both the [Rxi-5ms](#) and [Rxi-5Sil MS](#) contain some phenyl (5%), they also show coelutions for CBC and CBD under the GC conditions used for this work. The higher phenyl-content columns, the [Rxi-35Sil MS](#) (35% phenyl type) and the [Rxi-17Sil MS](#) (50% phenyl type; should be the 50Sil MS, right, but that's a story for another day), both resolve not only CBC and CBD, but also delta-8-THC (d8-THC), delta-9-THC (d9-THC), cannabigerol (CBG), and cannabinol (CBN). I prefer (and recommend) the [Rxi-35Sil MS](#) because of a slightly faster analysis time and more overall space between the peaks of interest.

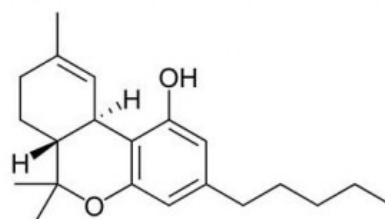
A few comments on the analyses: I used the same format columns for all the work, 15m x 0.25mm x 0.25µm. A 15m column with the proper selectivity easily provides the separating power for this work and is about half the cost of its 30m cousin. The 0.25mm x 0.25µm version has good sample loading capacity and is robust, especially when a proper split injection is used with a [Sky® Precision® split liner with wool](#). I also used hydrogen carrier gas, the fastest gas, and a good option if anyone is being impacted by helium availability and price.

If you are already using a "5 type" column for this work, don't panic! If you vary your GC conditions, especially carrier flow and oven temperature program, you can likely separate CBC and CBD, just not as easy or quickly as I've done it with the Rxi-35Sil MS. Also, I used a relatively fast oven program rate in my work, since I had the stationary phase selectivity in my favor and wanted to reduce analysis time, but if your GC won't heat that fast, you can still do the separation on the 35Sil MS, no problem. Contact me if you need help.

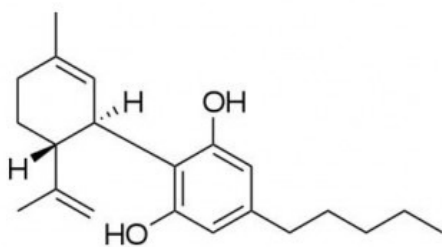
Restek continues to support the medical cannabis analysis community with GC and LC columns, accessories, and reference materials. Check out our [Medical Marijuana web page](#).



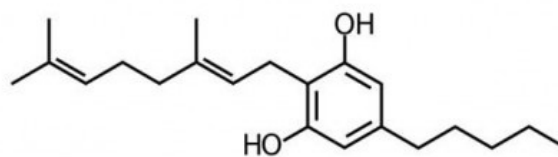
Cannabichromene (CBC)



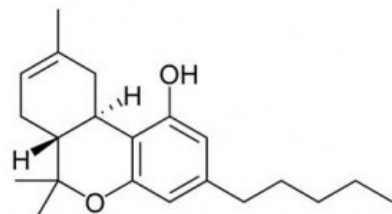
delta-9-THC



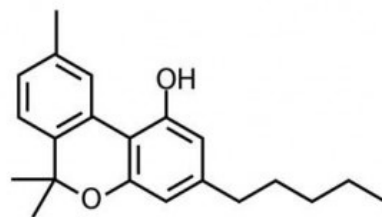
Cannabidiol (CBD)



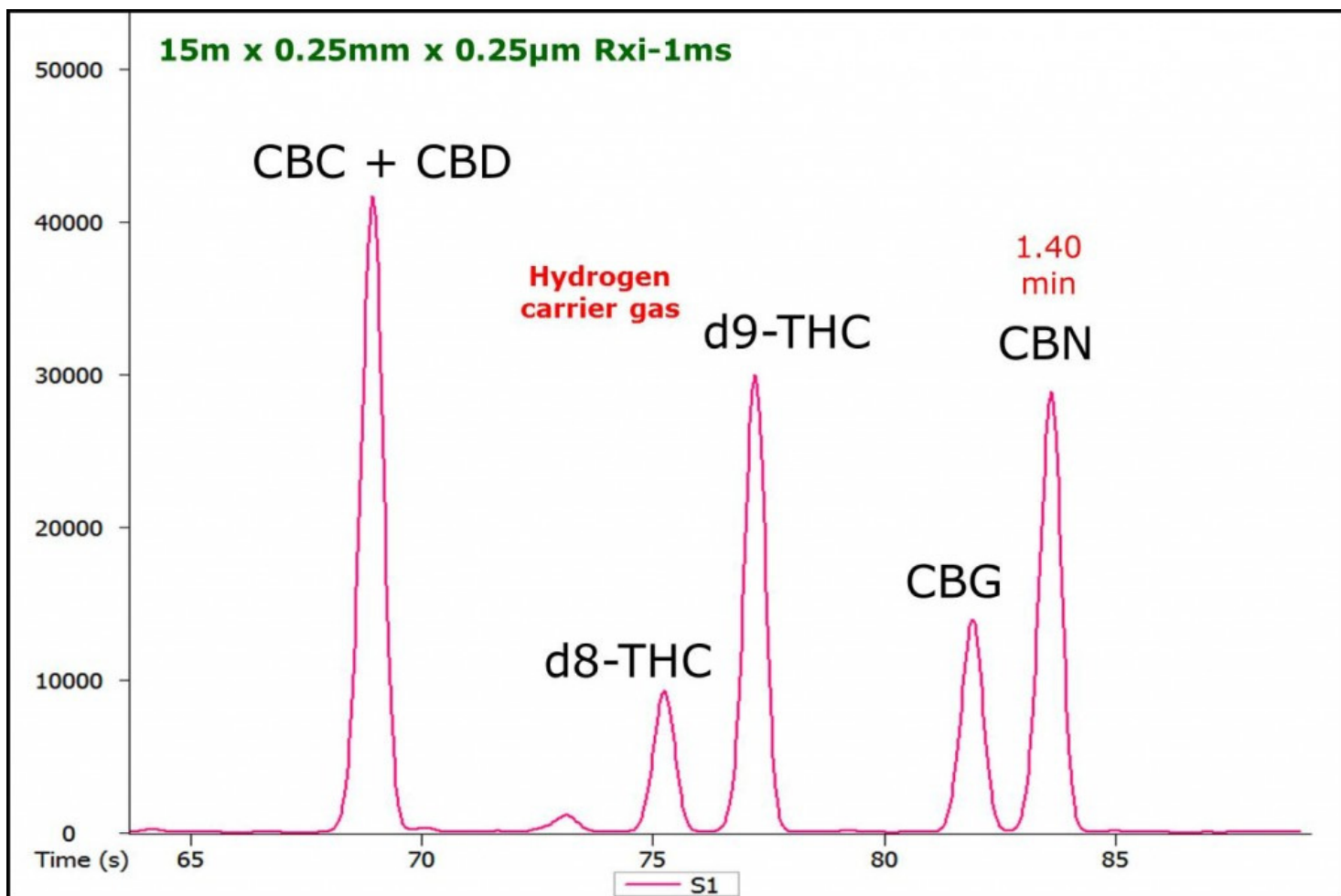
Cannabigerol (CBG)



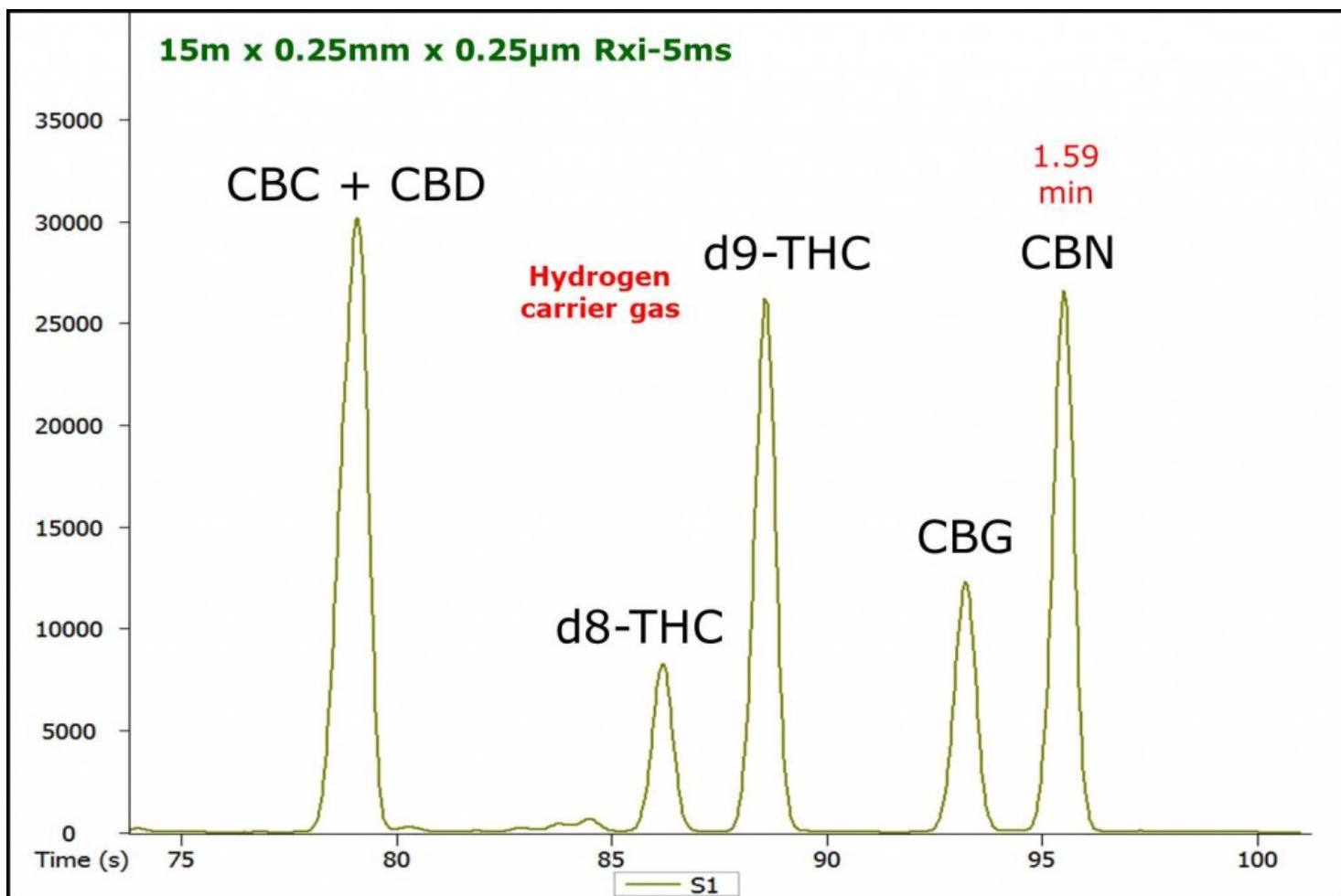
delta-8-THC



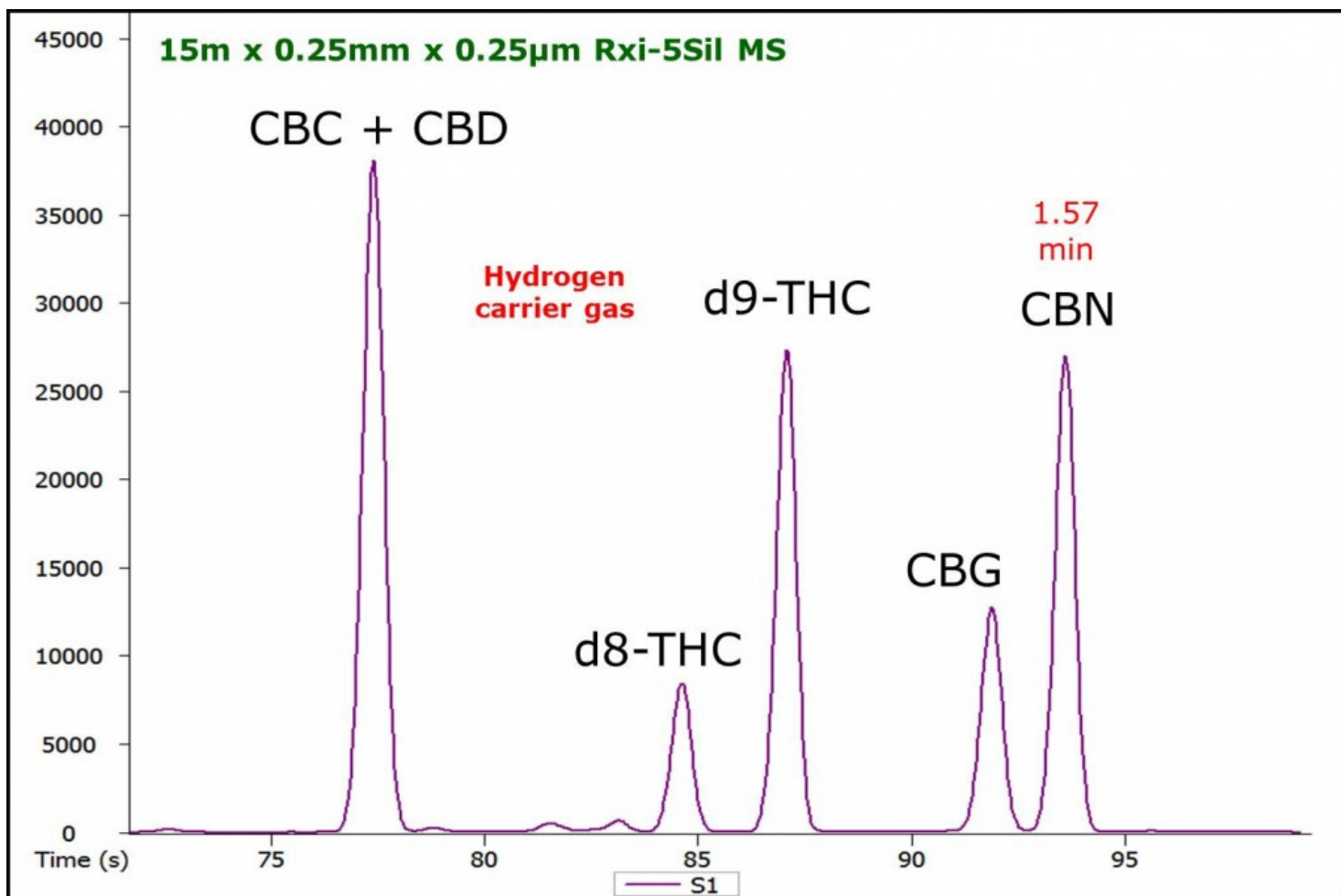
Cannabinol (CBN)



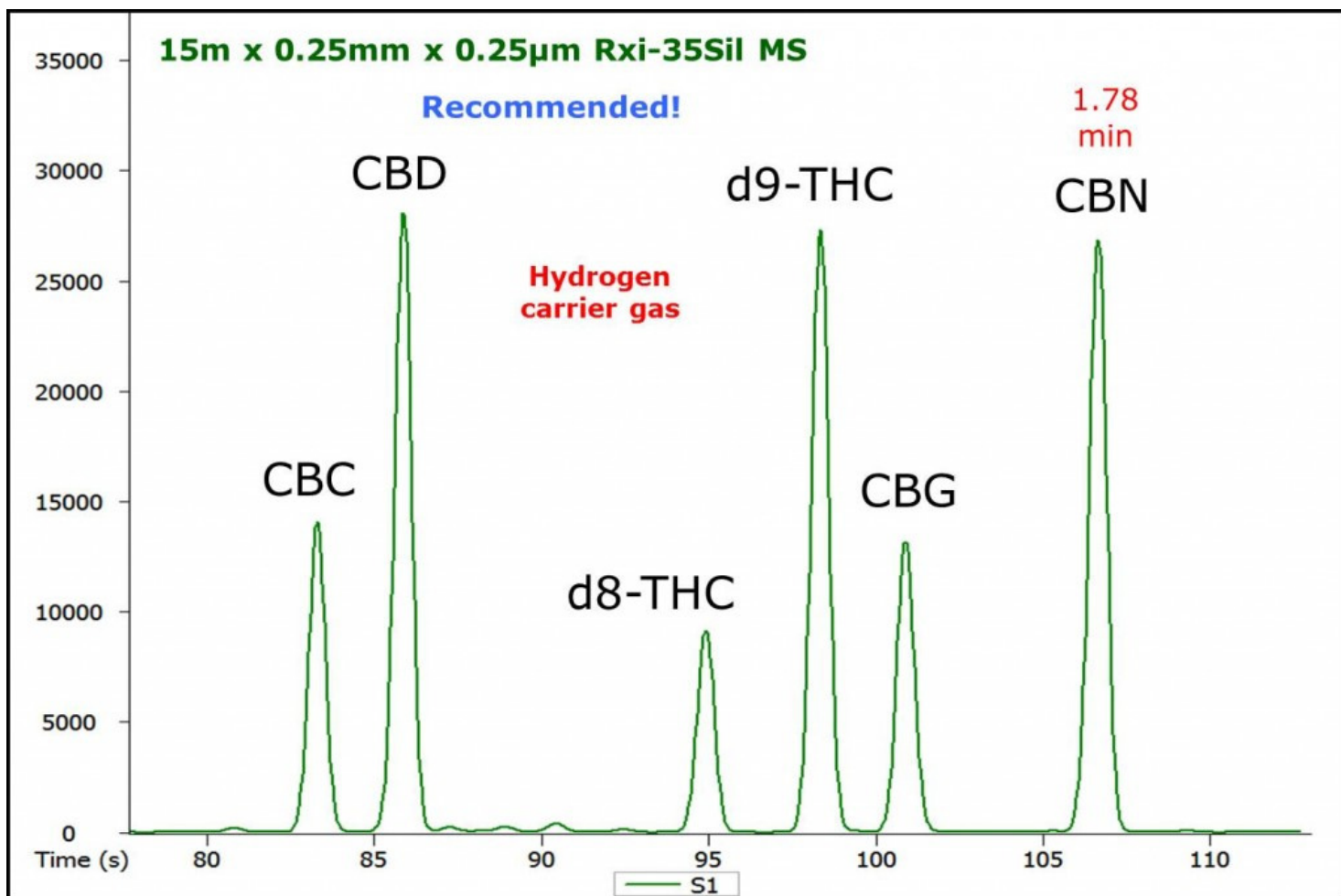
15m x 0.25mm x 0.25µm Rxi-1ms, constant flow H2 2.5 mL/min; Sky Precision split liner, 250°C, 50:1 GC oven: 225°C (0.1 min), 35°C/min to 330°C (0.9 min); Flame Ionization Detector 350°C



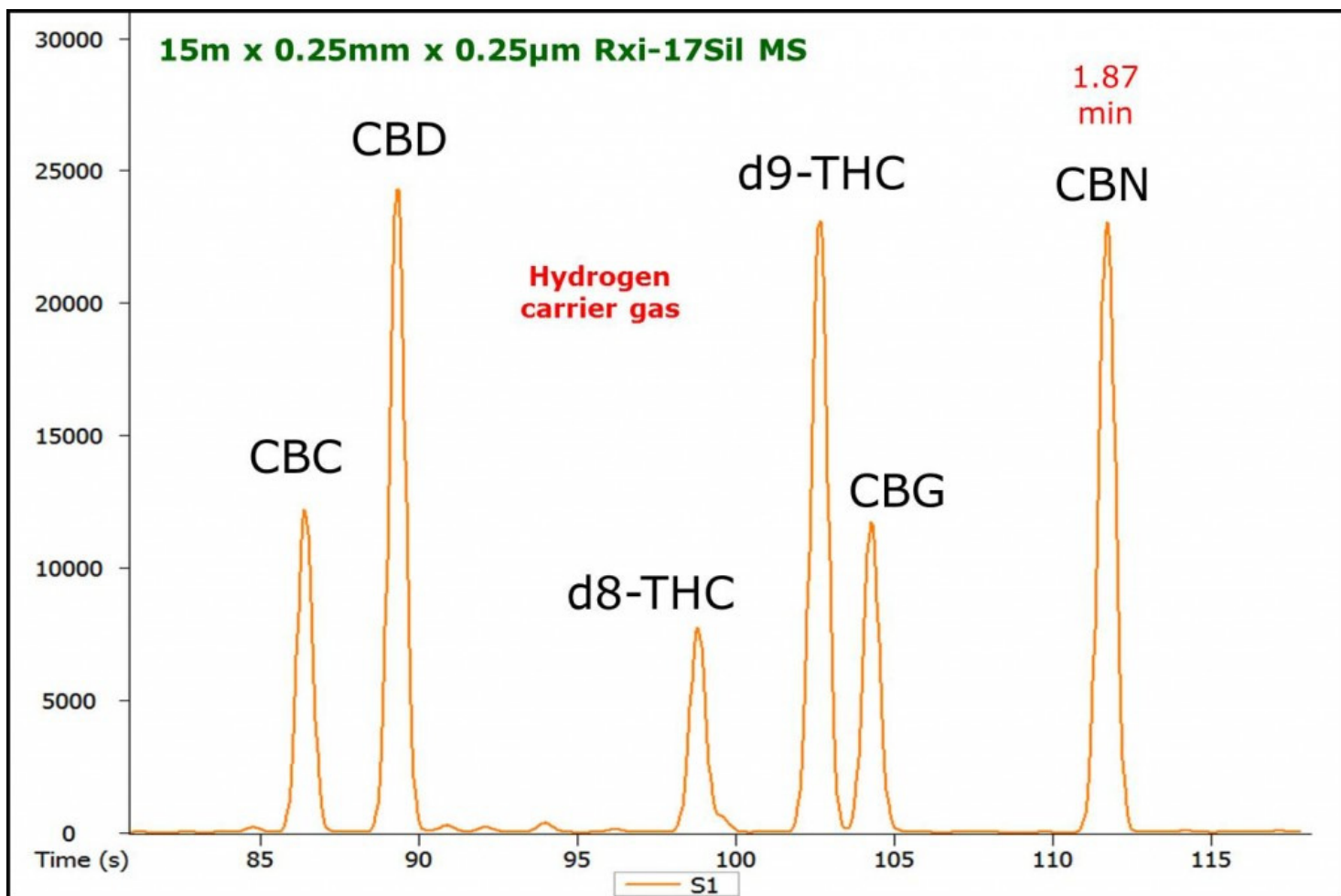
15m x 0.25mm x 0.25µm Rxi-5ms, constant flow H2 2.5 mL/min; Sky Precision split liner, 250°C, 50:1 GC oven: 225°C (0.1 min), 35°C/min to 330°C (0.9 min); Flame Ionization Detector 350°C



15m x 0.25mm x 0.25µm Rxi-5Sil MS, constant flow H2 2.5 mL/min; Sky Precision split liner, 250°C, 50:1 GC oven: 225°C (0.1 min), 35°C/min to 330°C (0.9 min); Flame Ionization Detector 350°C



15m x 0.25mm x 0.25µm Rxi-35Sil MS, constant flow H2 2.5 mL/min; Sky Precision split liner, 250°C, 50:1 GC oven: 225°C (0.1 min), 35°C/min to 330°C (0.9 min); Flame Ionization Detector 350°C



15m x 0.25mm x 0.25µm Rxi-17Sil MS, constant flow H2 2.5 mL/min; Sky Precision split liner, 250°C, 50:1 GC oven: 225°C (0.1 min), 35°C/min to 330°C (0.9 min); Flame Ionization Detector 350°C

This entry was posted on Sunday, February 17th, 2013 at 6:45 pm and is filed under [Alternate GC Carrier Gases](#), [Medical Marijuana](#), [Optimizing Applications](#). You can follow any responses to this entry through the [RSS 2.0](#) feed. You can [leave a response](#), or [trackback](#) from your own site.

One Response to “Don’t overestimate cannabidiol during medical cannabis potency determinations with gas chromatography. Use stationary phase selectivity for accuracy and hydrogen for fast analysis.”

1. [The separation problem with CBC and CBD in GC analysis of medical cannabis with 5% phenyl-type columns « ChromaBLOGraphy: Restek's Chromatography Blog](#) says:
[June 14, 2013 at 9:53 pm](#)

[...] my post, “Don’t overestimate cannabidiol during medical cannabis potency determinations with gas chromatogra...”, I showed how an Rxi-35Sil MS GC column provides excellent separation for cannabichromene (CBC), [...]

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