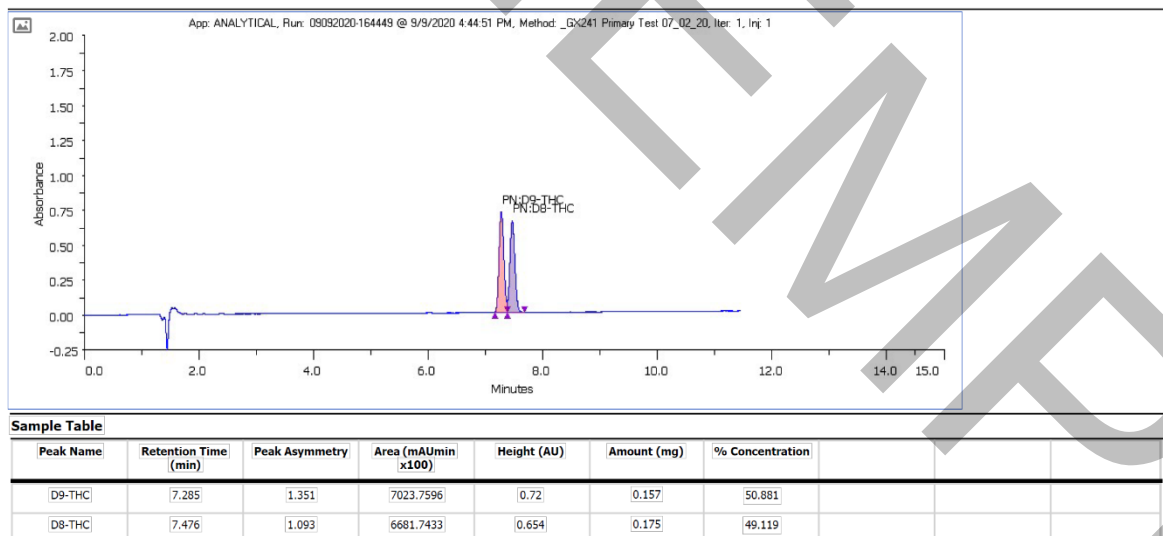




The Importance of Developing Industry Wide Analytical Methodology to Accurately Analyze Cannabinoid Isomers

As the hemp industry progresses into the production and sale of different hemp-derived isomers, we are collectively seeing problems with third party analytical laboratories in the accurate testing of these isomers. Utilizing our in-house analytical department, we developed confirmed analytical methods on UV-DAD HPLC that can accurately analyze and differentiate between cannabinoids and their isomers.

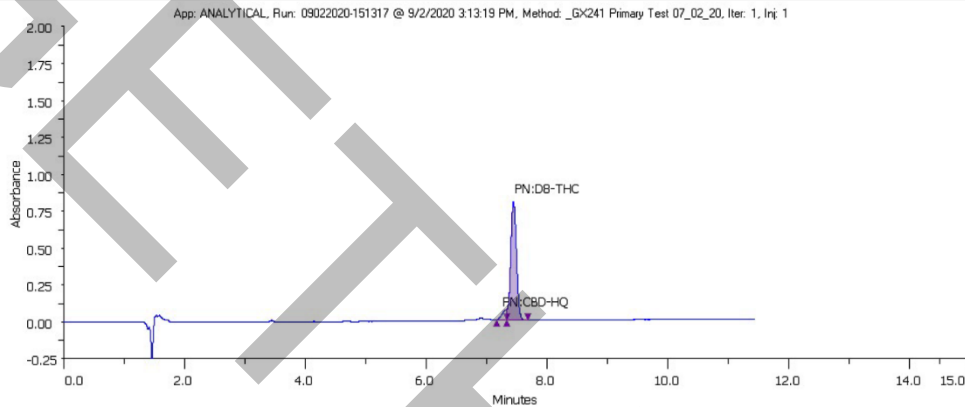
The most common reason that most third party analytical laboratories are not accurately determining the amount of D9-THC in D8-THC distillate is due to an isomer called Cannabidiol Hydroxy Quinone (or CBD-HQ for short). When running analytical HPLC UV-DAD methods on cannabinoids, CBD-HQ elutes very closely (if not identically in most "industry standard" methods) to where D9-THC and D8-THC elutes on a chromatogram, therefore can easily be miscalculated/mislabeled as D9-THC. The following chromatogram shows a 50% D9-THC / 50% D8-THC sample being analyzed.



If the method does not provide clear separation between isomer/cannabinoid peaks on the chromatogram, then it leaves room for error in labeling peaks. The method that we developed shows elution time of D9-THC appearing sooner in the chromatogram, therefore able to be accurately identified/analyzed.

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The following chromatogram shows a 98%+ D8-THC sample with trace amounts of CBD-HQ. This is commonly mistaken as D9-THC.



Sample Table

Peak Name	Retention Time (min)	Peak Asymmetry	Area (mAUmin x100)	Height (AU)	Amount (mg)	% Concentration
CBD-HQ	7.343	1.232	661.8459	0.075	0	1.713
D8-THC	7.453	1.023	8894.3225	0.799	0.234	98.142

When analyzing a resulting chromatogram from D8-THC using the analytical method that was developed in-house, when CBD-HQ is present it appears more as a “shoulder” to D8-THC, whereas D9-THC has a clearly defined peak and separate elution time. CBD-HQ is simply an oxidized version of CBD and along with D8-THC also has promising potential for further research.