Rapid Analysis of Cannabinoid Potency and Terpene Analysis

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Introduction

As states continue to legalize medicinal and recreational marijuana use, there is a need for a simple and reliable analysis method to determine the cannabinoid levels for growers and testing labs. This method would not only allow potency determination for quality control, but also provide growers important information to monitor their process and product. For testing labs, short analysis times are imperative as the sample quantities are sure to increase as the market grows. For these short analysis times, small particle columns had been required, but smaller particle columns clog more easily and have shorter lifetimes. This poster shows the successful separation of 12 cannabinoids in under 5 minutes and illustrates the versatility of the system.

Currently terpene analysis is performed by gas chromatography requiring a second instrument increasing the lab operation cost. Here we show how this can potentially be overcome by also performing the terpene analysis on the HPLC showing the versatility of one instrument doing the job of two. With the addition of a mass spectrometer, the analysis of the cannabinoids and terpenes can likely be combined into one quick and easy analysis.

Methods and Materials

The cannabinoid standard consisting of the cannabinoids shown in figure 1 was obtained from Cayman Chemicals. In addition CBDVA and THCVA was provided by the Prism Sciences The hemp sample obtained from Prism Sciences was diluted in acetonitrile. The terpenes sample containing 19 terpenes was obtained from Restek. A 5um C18 column from Prism Sciences was used for the separation using a gradient with water and acetonitrile. The quaternary HPLC with a UV detector was used for the analysis.

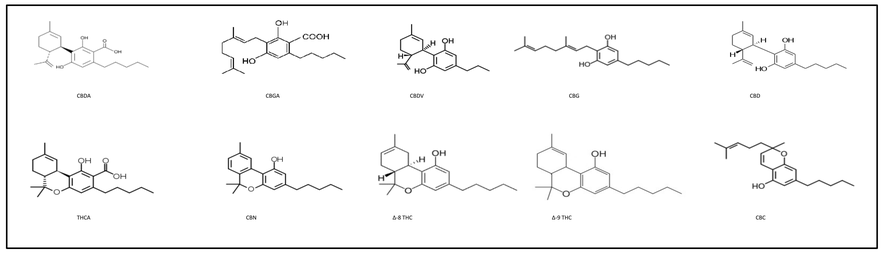

Figure 1. 10 cannabinoid structures.

Results

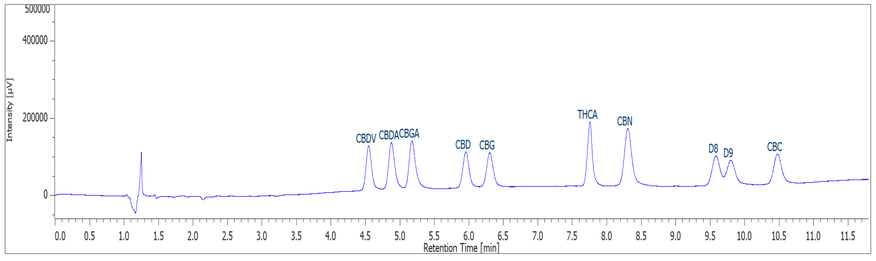

Figure 2. Chromatogram of the 10 cannabinoids.

The 10 cannabinoids are separated and identified in less than 11 minutes as shown in figure 3. This same method was applied to the hemp sample and terpenes.

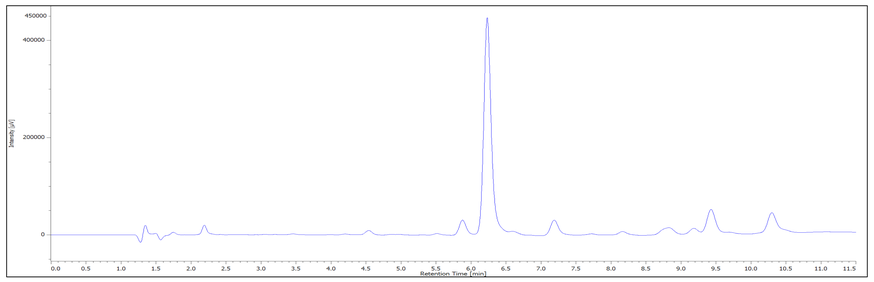

Figure 3. Hemp chromatogram.

The resolution provides the ability to identify and determine the amount of CBD in the hemp sample (figure 3). In addition the method can be applied to look at the terpene profile of a sample which is important in understanding the aromas and flavoring of samples. Figure 4 shows separation of the 19 terpenes and the ability to identify each of the terpenes using 2 UV wavelengths.

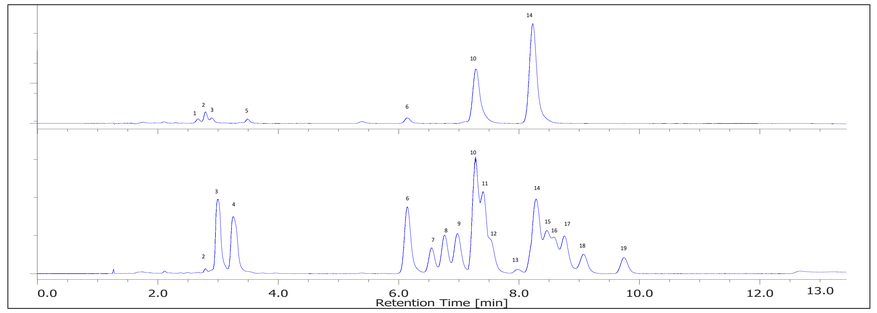

Figure 4. Terpenes Chromatogram. All 19 of the terpenes are resolved enough to identify.

The 12 cannabinoids are separated and identified in less than 5 minutes as shown in figure 5 on the 5um C18 column. The successful separation of the cannabinoids on the HPLC provides a rapid method for identification and determination of the amount of each of the cannabinoids.

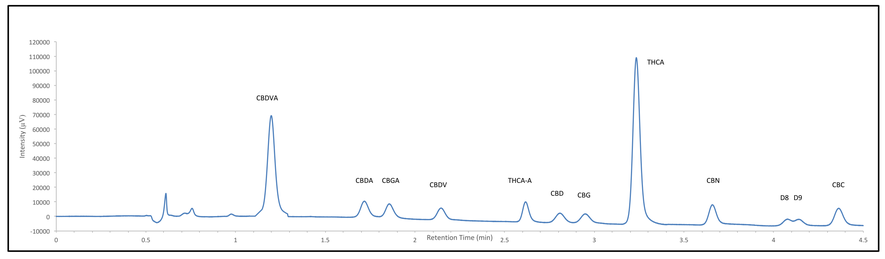

Figure 5. Rapid Separation of 12 Cannabinoids.

Future

In the future we plan to add additional cannabinoids and further develop the separation. The rapid separation method will be applied to the hemp sample and the terpenes and a mass spectrometer will be added to provide identification of the terpenes.

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