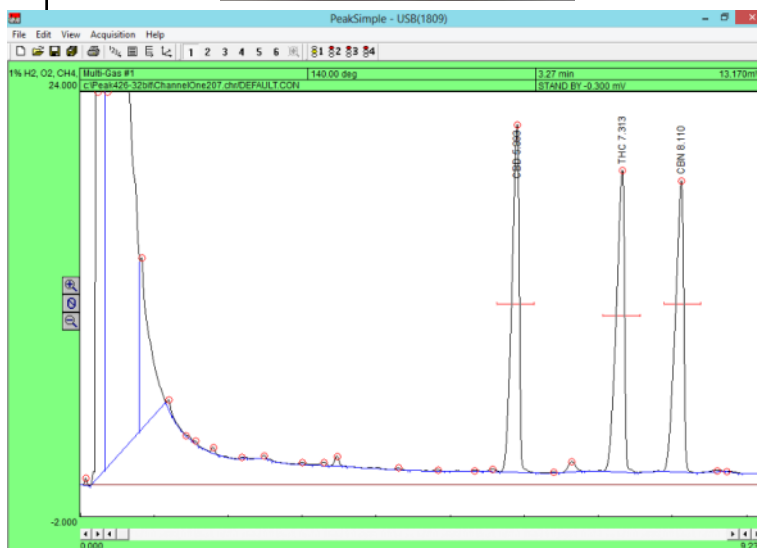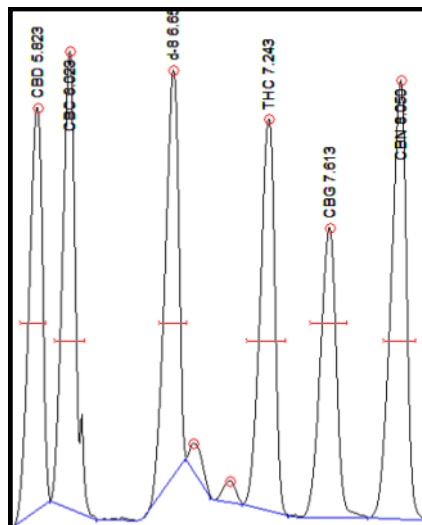# Calibrating Six Cannabinoids with CBD Reference Standard

There are six major cannabinoids that can be detected by the SRI 8610 FID Potency GC: Cannabidiol (CBD), Cannabichromene (CBC), D8-THC, D9-THC, Cannabigerol (CBG), and Cannabinol (CBN). Individual reference standards to calibrate all six cannabinoids can be obtained from chemical standard suppliers like Restek.

Sometimes all six cannabinoid standards are not available for calibration due to their cost or the time involved in individually injecting and calibrating. When this is the case, you can calibrate all six cannabinoids off of a CBD (or CBN) reference standard (obtained singly or in the Restek 3 Cannabinoid standard).

The six cannabinoid molecules are so chemically similar to each other that they will have near equal responses on the FID detector. 40% CBD will have the same area counts (and thus the same calibrated percent) as 40% THC (and 40% CBC, 40% CBG, etc.)* This principle can be confirmed by running a typical Restek cannabinoids standard and noticing that the three peaks are nearly identical in area counts.

*For more information about this phenomena, read *A Contribution to the Improvement of Accuracy in the Quantification of THC* by A.J. Poortman-van der Meer and H. Huizer, *Forensic Science International 101*, 1999.
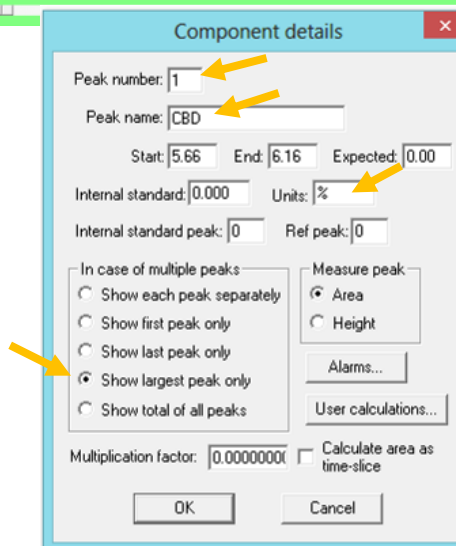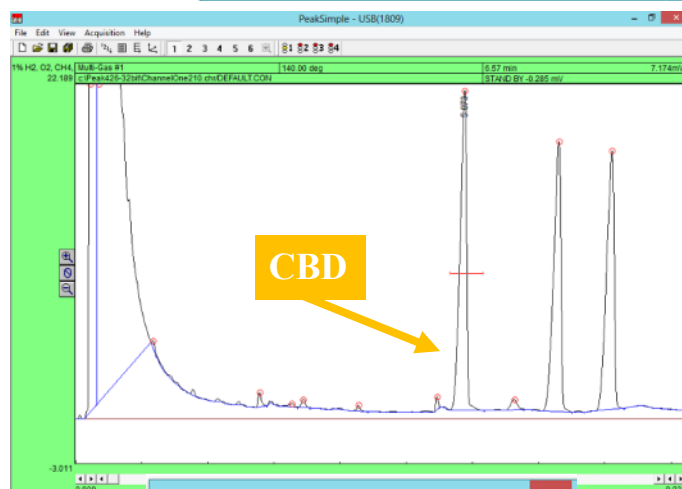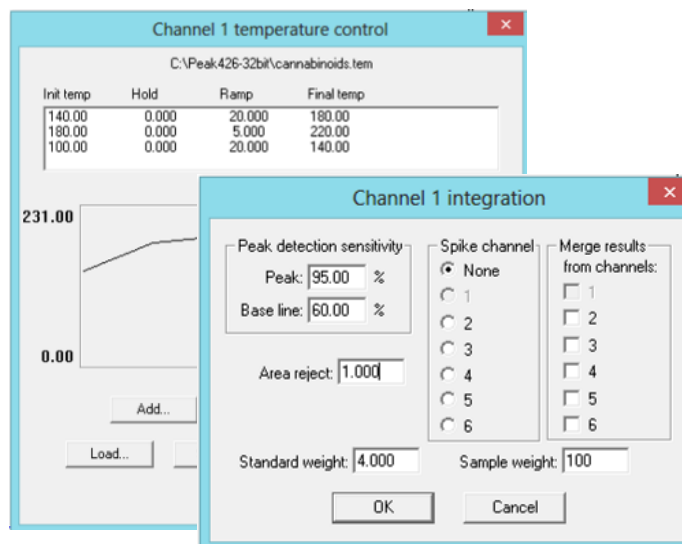
Calibrating Six Cannabinoids with CBD Reference Standard

To calibrate all six cannabinoids off of a CBD reference standard inject either the Restek Cannabinoids Standard (containing CBD, THC, and CBN) or an individual CBD standard into the GC under your usual cannabinoid analysis temperature program and parameters. For more on this, see our document *Medical Herb Potency Testing* on our website at www.srigc.com.

When the run is complete you will see either the lone CBD peak or three cannabinoid peaks, depending on which standard you injected. Either way, the first peak is CBD. Right-click over the CBD peak and select "Add component". A red retention window should now be over the peak.

Right-click over the peak again and select "Edit component". In the "Component details" screen assign the peak a number, the name "CBD", enter "%" into the Units box, and select the "Show largest peak only" radio button before selecting the OK button.

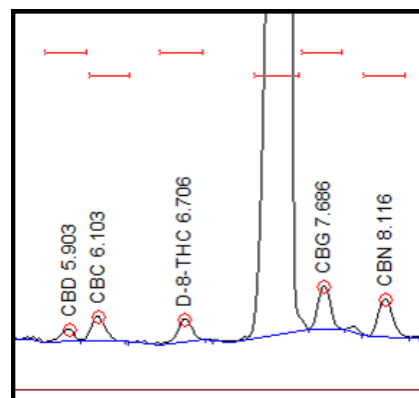# Calibrating Six Cannabinoids with CBD Reference Standard

Right click on the CBD peak and select "Calibrate CBD". Select "No" in the Load template calibration file screen and make sure "1" is selected on the "Recalibration level" screen. This will open the Calibration Screen. Enter "1000" under "Injected" (if you are using a 40% concentration calibration standard) and select the "Accept new" button. This will place the area of the CBD peak under the "Area/height" field. **Note this number**, as it will be used later to calibrate the other five cannabinoids.
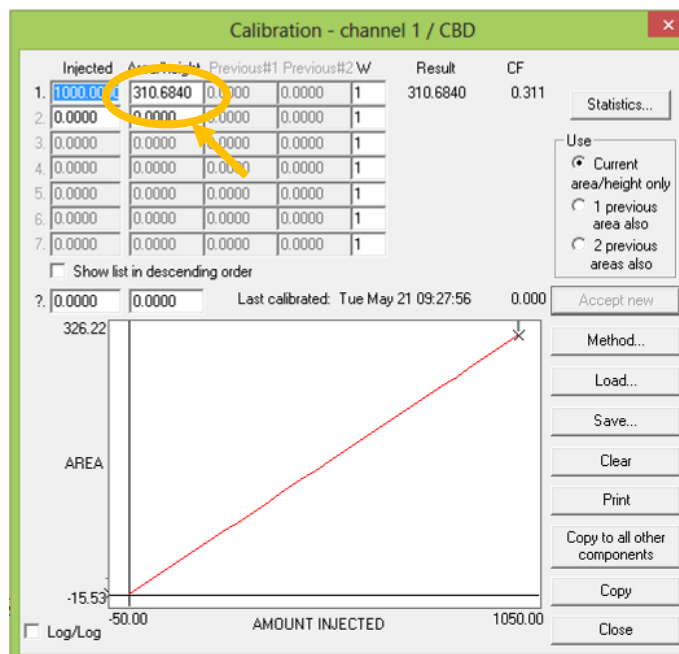
Extract and inject an actual cannabis strain into the GC, preferably one in which you know there are all six cannabinoids present. Usually, (but not always) high potency strains and concentrates will have *some* amounts of all six cannabinoids. The chromatogram may look something like the one to the right.
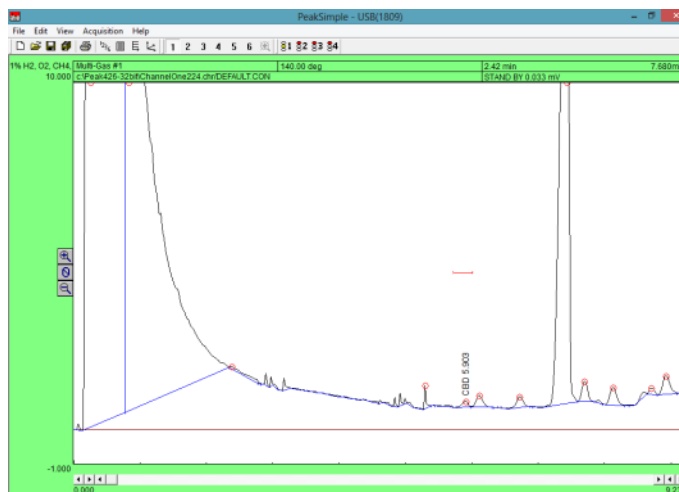

Identify the elution order on the stock MXT-500 column (other columns may have different elution orders). First out is (1) CBD, followed closely by (2) CBC. (3) D-8 THC comes out midway between CBC and (4) D-9 THC. (5) CBG comes out right after D-9 THC and just before (6) CBN. Add component windows and identify all the cannabinoids as shown to the right.
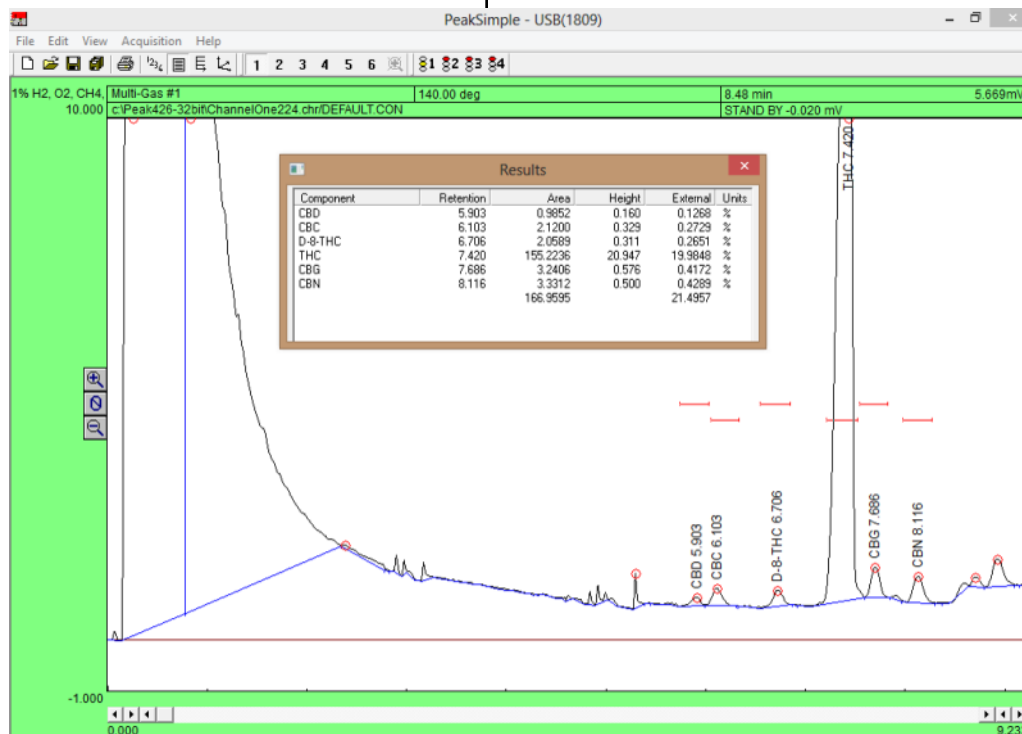
Calibrating Six Cannabinoids with CBD Reference Standard

Calibrate each cannabinoid individually using the value obtained from the CBD calibration standard. Do not hit "Accept new", use the same area count that you obtained with the CBD Calibration Standard. For CBC, right click on the CBC peak and select "Calibrate CBC". In the "Calibration Channel 1/CBC" screen enter "1000" under "Injected" and the value you obtained from the CBD calibration standard under "Area/height". In our example, this number is "310.684". Save the calibration file and select "OK". Do this same process for the other cannabinoids.
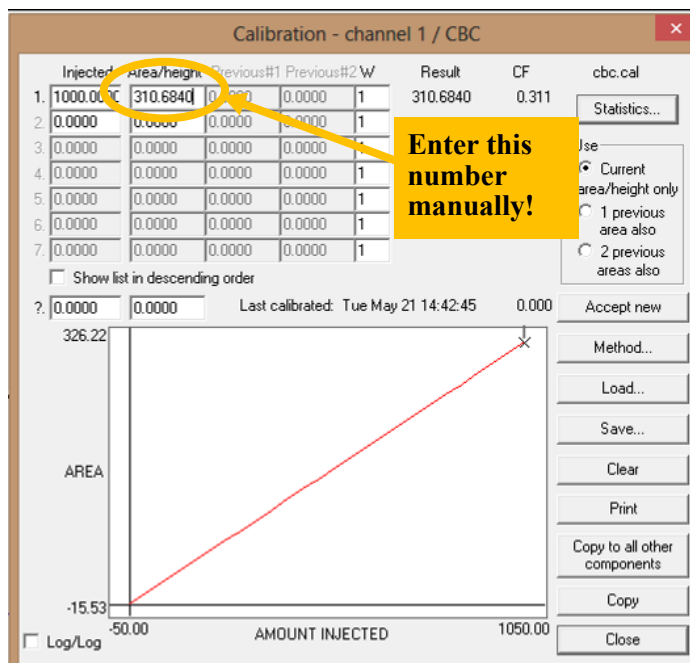
Below is an actual strain with all six cannabinoids calibrated off of a CBD calibration standard.