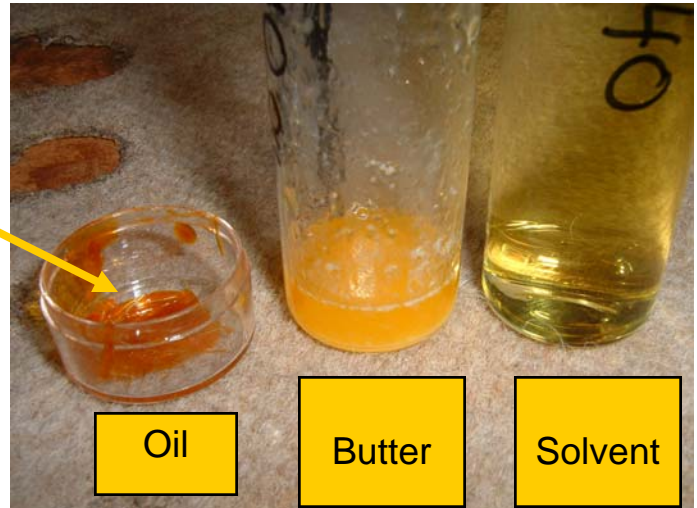
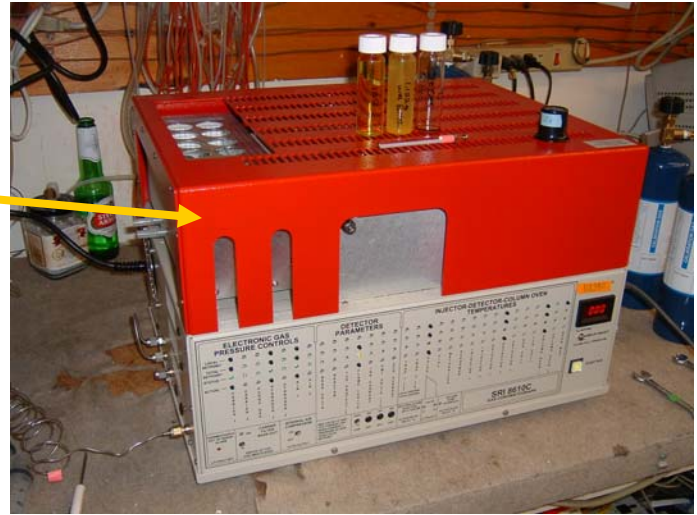


Measuring THC in Butter using the SRI 8610C GC

The THC in butter analyses were performed using an SRI 8610C GC configured for cannabinoid analysis.

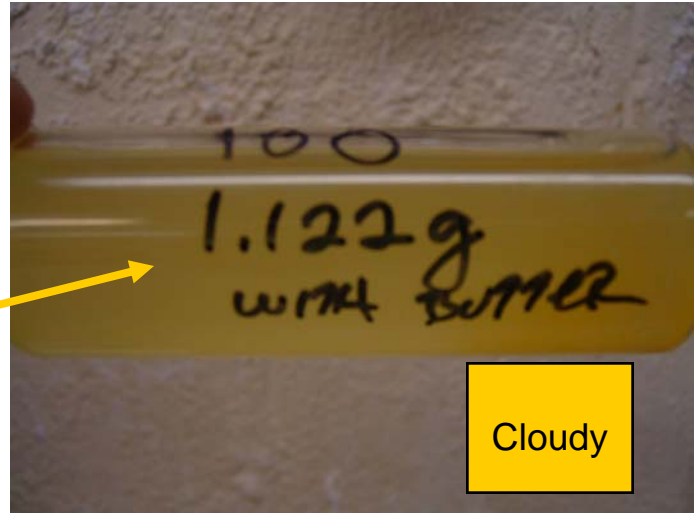
100 milligrams of a cannabis oil was weighed into two identical 40ml vials. The oil was a CO2 extract with an orange color. We used the oil for this test because it was very uniform in consistency.

The first vial was filled with methanol and placed in the built-in sample incubator which is part of this GC configuration. To the second vial was added 1 gram of butter. The butter vial was placed in the incubator WITHOUT solvent until the butter melted and dissolved the cannabis oil. The cannabis oil could clearly be seen to dissolve in the butter. The incubator was set to 50C. A third vial with no oil was loaded with 1 gram of butter for comparison.



Measuring THC in Butter using the SRI 8610C GC

After 30 minutes in the incubator the two butter vials were filled with methanol and placed back into the incubator. Once the methanol warmed to 50C the butter vials were shaken for 30 seconds to disperse the butter into very fine droplets. This made a cloudy looking suspension. The butter vials were again placed into the incubator for 30 minutes.

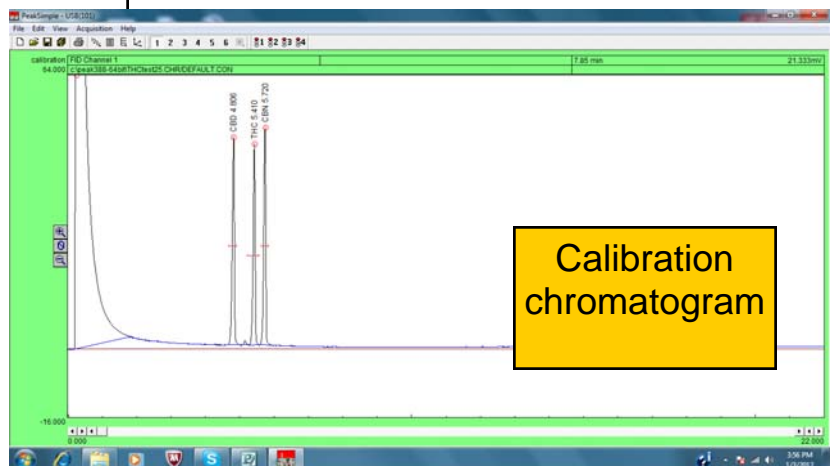


After another 30 minutes the butter solids dropped to the bottom of the vial leaving clear liquid in the top of the vial. Interestingly, the suspension did not clear at room temperature, only when heated in the incubator.



Meanwhile the GC was calibrated with a mixture of CBD, delta9THC and CBN each at a concentration of 333ng/ul. 1ul was injected on-column into a 15 meter MXT500 capillary column with .53mm id and a film thickness of .15 micron.

The temperature program was set to start at 140C hold for 0.00 minutes, then ramp at 20 degrees per minute to 380 C then hold. The FID was set to 380C. Hydrogen carrier was used at 5psi or 10ml/min.

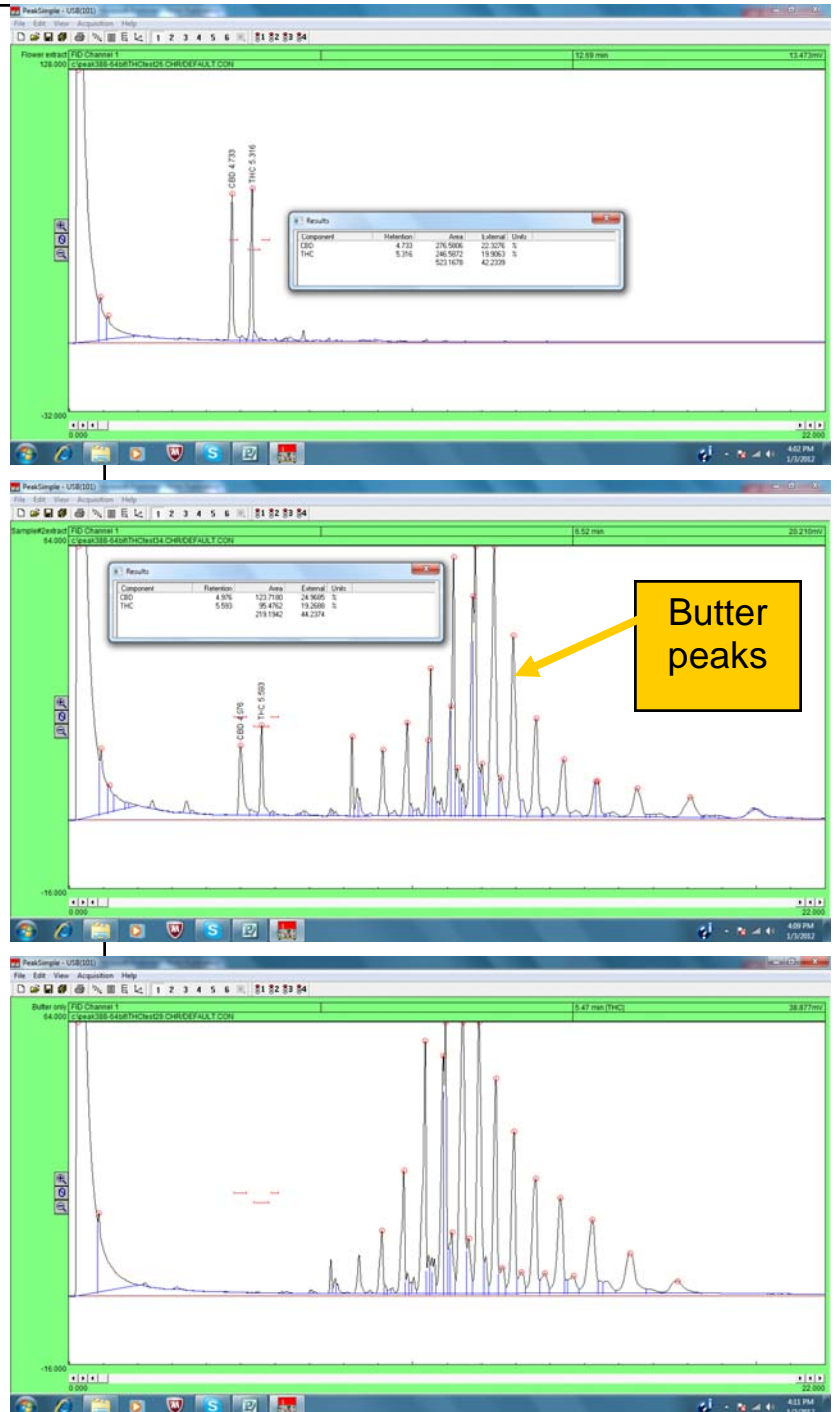


Measuring THC in Butter using the SRI 8610C GC

The oil only extract was injected and the results showed 22.3% for CBD and 19.9% for d9THC. Presumably this particular oil was prepared from industrial hemp since the CBD was so high.

The vial with butter and oil was injected and the results showed 24.9% for CBD and 19.3% d9THC. Some thickening of the CBD is apparent while the THC peak looks much the same as the non-butter vial.

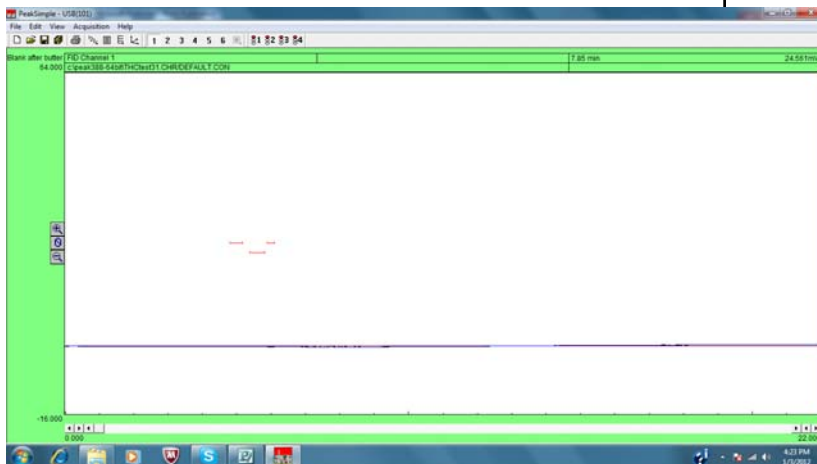
The vial with butter only (no oil) was injected for comparison. No interfering peaks were observed at the CBD or THC times but the butter peaks appear identical.



Measuring THC in Butter using the SRI 8610C GC

A blank run was made after the butter chromatograms. No carryover peaks or residue from the butter was observed.

We did notice that the retention times of the CBD and THC were shifted about 3% earlier with the 1 gram butter injections, but returned to the normal time in subsequent injections of non-butter samples.



We made a more concentrated butter extract (3 grams butter in 40 ml methanol) and saw the retention times move even earlier. We suspect the butter temporarily covers the stationary phase of the column resulting in less retention.

Conclusion:

This experiment shows that a simple methanol extraction completely transfers THC and CBD from butter into the methanol and avoids problems with the butter fats on the GC so long as the column is taken high enough in temperature during each analysis to elute the butter fats completely. The MXT500 column which was used is rated to over 400C which allows this high temperature operation. In addition the thin film promotes fast elution of the high boiling molecules. Even so, the analysis took 22minutes.

The peculiar shape of the CBD peak and the evidence that the butter increases the CBD number but not the d9THC is not explained and requires further investigation.