Simple Cannabis and Hemp Potency Testing Using a Low Cost Gas Chromatograph

The image of a white coated laboratory PhD surrounded by millions of dollars of complicated lab equipment is what most think of when the subject of lab testing comes up.

While some complicated tests may require this level of skill and equipment, many are surprised at how easy and inexpensive it is to use modern laboratory instruments to accurately measure the cannabinoid potency levels in cannabis and hemp flower, concentrates, and edible products. Delta-9 THC is the most commonly measured cannabinoid, but CBD, CBN, and sometimes other cannabinoid molecules like CBC, CBG, delta-8 THC, THCA, and terpenes are measured at the same time.

A Gas Chromatograph (GC) like the $11,134.00 system shown from SRI Instruments performs this test in 10 minutes at a cost of about 15 cents per test. With only a few hours of training anyone can do their own laboratory quality testing, potentially saving as much as the $100 per test charged by some testing labs. Results are available to the user in as little as 30 minutes rather than the multi-day wait when samples are sent to a testing lab.

The GC is small enough to fly with as airline baggage (in the shipping box), and can be set on any counter, kitchen table or pickup truck tailgate for use indoors or out.

Part# 0310-0091 **SRI 310MM Cannabis and Hemp GC System** $11,134.00
0310-0095 **SRI 310MM Edibles Cannabis and Hemp GC System** $12,896.00

(2022 pricing, prices subject to change, consult most recent price list.)

SRI Tech Support: 310-214-5092

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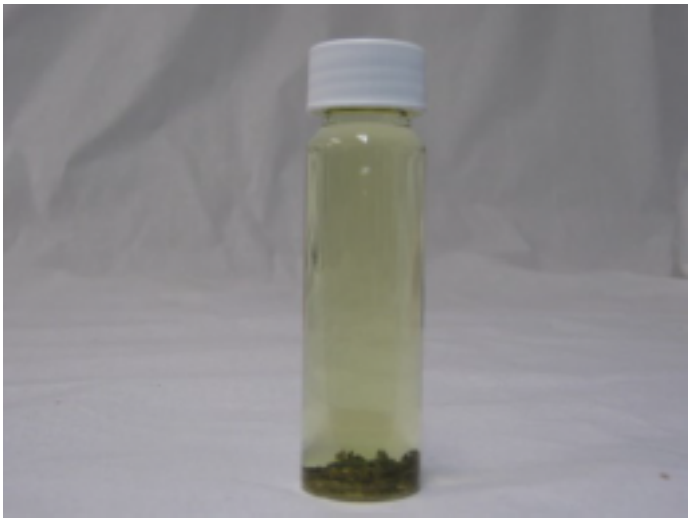
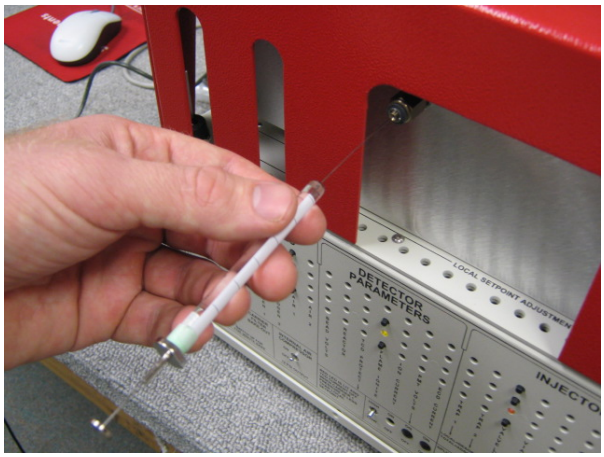
The process starts by weighing one tenth of a gram (100 milligrams) of cannabis flower, concentrate, or edible product into a small glass bottle. Bottles like this cost about one dollar and can be re-used over and over.

The bottle is filled with denatured alcohol (or other solvent) which you can buy at the hardware store for about $15 per gallon, or about 15 cents per test.

The alcohol extracts the cannabinoid molecules out of the flower or edible product and dissolves the concentrate.





After about 20 minutes, a small amount of the alcohol extract is injected into the GC with a syringe.

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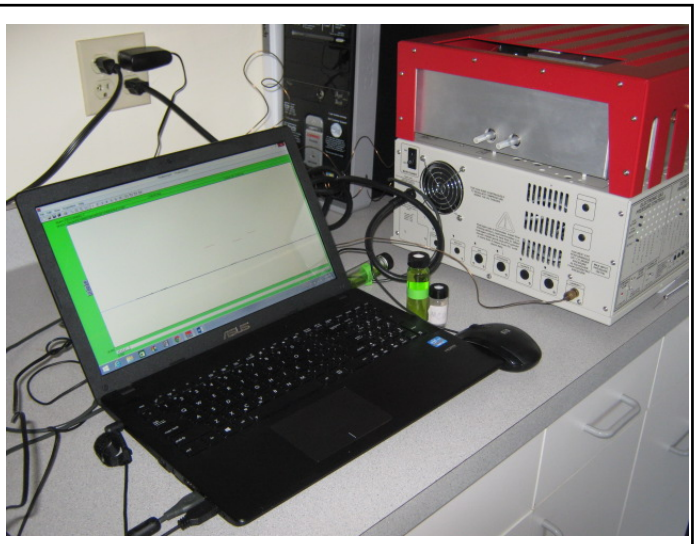
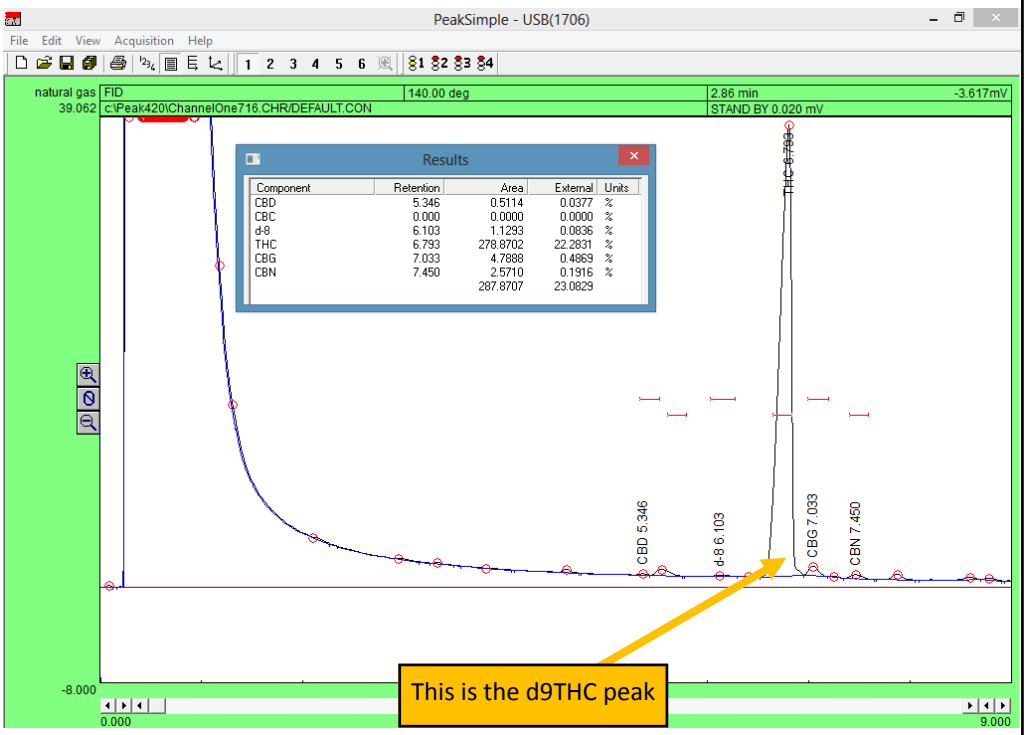


A laptop, tablet or desktop computer is connected to the GC with a USB cable, and displays the data from the just injected sample. 10 minutes after injecting the extract, the results appear on the computer screen.



A typical cannabis flower sample with 20% d9THC looks like this on the computer screen. The THC peak is the large one, and the smaller bumps are CBD, CBC, CBG and CBN. It is normal with cannabis flower for the cannabinoids other than d9THC to be less than 1%.

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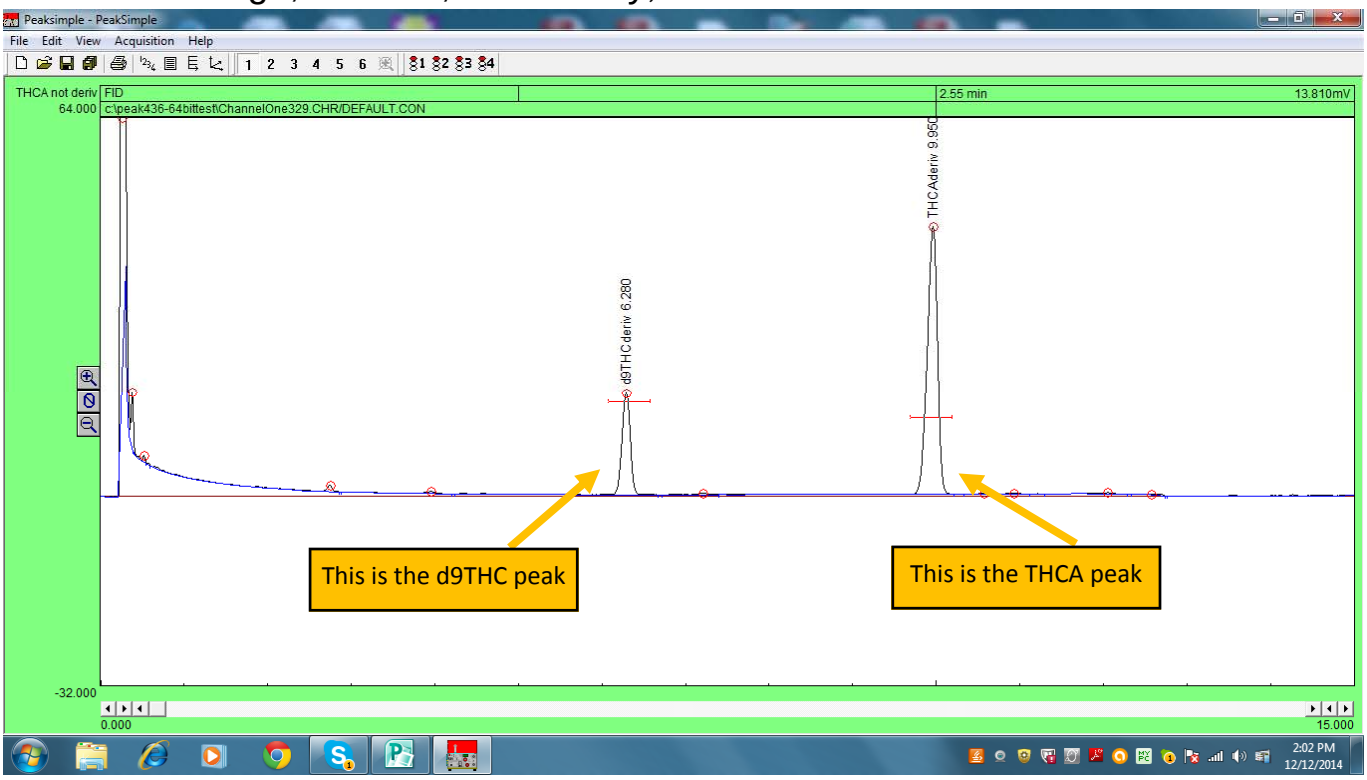
It is not well known, even among professional testing labs that GC can also measure THCA (tetrahydrocannabinolic acid). THCA is the pre-cursor molecule which is actually manufactured by the cannabis plant. Over time and with temperature, the THCA decarboxylates (loses one carbon and two oxygen atoms) and turns into d9THC. Edible product makers will typically process the fresh cannabis by heating it or stirring with hot butter to deliberately decarboxylate before adding to the cookie dough, brownie, hard candy, etc. The GC is invaluable because not



only can the proper decarboxylation of the ingredients be confirmed prior to mixing it in to the final product, but the final product's THC content can be determined before sale or distribution. Even if a "certified" lab must be used by state law to measure the THC levels, it is helpful and economical to be able to make quick in-house tests during the production process.

For more information, see our **THCA and Derivatization document** located at www.srigc.com: https://www.srigc.com/cn/downloads/95/THCAvsd9THCtestingDec2014.pdf

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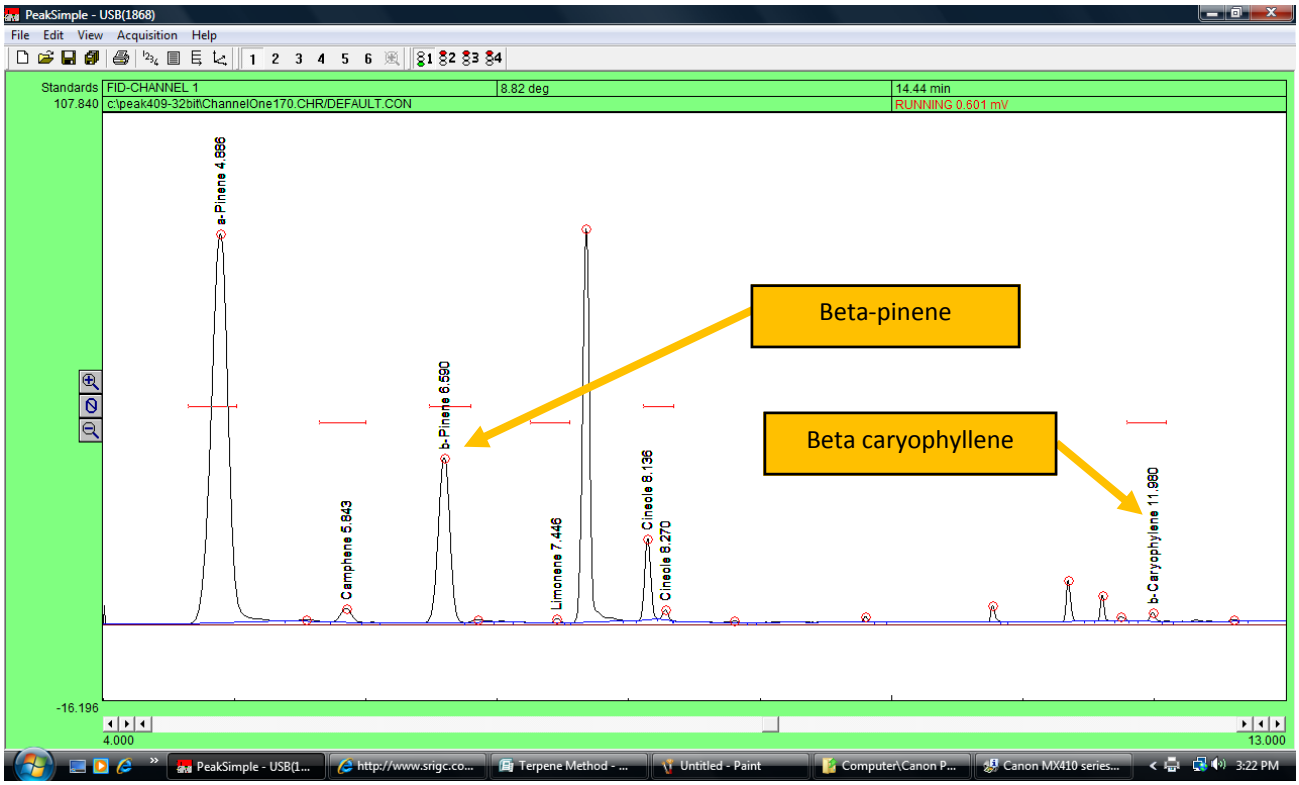
The GC can also be used to measure the terpene profile (smell molecules) of cannabis. The chromatogram below shows a terpene profile from an actual flower sample. About 20 different terpene molecules can easily be measured. For more information see our ***"Terpene Testing"*** document at www.srigc.com: https://www.srigc.com/cn/downloads/87/Terpene%20Method.pdf



Residual solvents in BHO (butane) or CO2 (carbon dioxide) extracted concentrates can also be easily measured using the GC.
For more information, see our "***Residual Solvents in Cannabis***" document at www.srigc.com: https://www.srigc.com/cn/downloads/91/ResidualSolventsJNov2014.pdf

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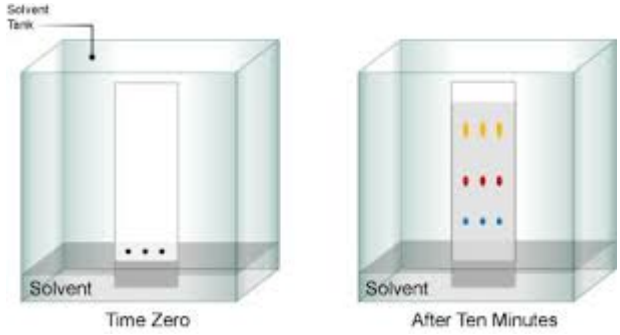
Other more expensive types of laboratory instruments can also be used for the same type of tests. High Pressure Liquid Chromatography (HPLC) systems such as the one shown cost about $40,000 to buy and about $10 per sample to operate. A higher level of training is necessary for HPLC as compared to GC. In the past, it was thought that only HPLC could measure THCA separately from d9THC, so many labs purchased HPLC systems-based on this erroneous notion. HPLC can measure terpenes, but can not measure residual solvents.

Thin Layer Chromatography is attractive because the start up costs to purchase are below $1000, but the cost per test is at least several dollars and sometimes as much as $20 per test. Results are not as accurate as GC or HPLC. Residual solvents and terpene measurements are not possible.



In summary, gas chromatographs are simple enough for most people to operate with a few hours of training, deliver the most accurate results for the lowest cost, and allow for portable operation. Many people who are now suffering from high testing costs, or irritating delays could solve their problems by taking advantage of this technology.