



# Select the right instruments for potency testing

**Agilent** provides laboratories worldwide with instruments, services and expertise, enabling customers to gain the insights they seek.

There is a bewildering range of instrument choices for the testing of potency in cannabis products. Setting up a cannabis-testing laboratory involves several significant decisions, and instrument selection for potency testing is one of the most important ones. With so many claims in the market about the performance of testing technologies, which one is right for your laboratory?

## Potency testing methodologies

There are three primary testing technologies a laboratory can implement for potency testing at a commercial scale: HPLC, LC/MS, and Fourier transform infrared spectroscopy (FT-IR). Each offer their own merits.

- HPLC:** these systems are the most common choice for commercial potency testing. They involve separating the mixture of cannabinoids and detecting the amount of light absorbed at a specific wavelength to determine the amount of cannabinoids present. With this technique, labs can achieve high-throughput potency analysis of cannabis, hemp, oils and concentrates. This benchtop technique produces replicable results and can identify cannabinoids within 5–20 minutes.
 
- LC/MS:** this form of cannabis potency testing is used in scenarios when identification is critical. An LC/MS system consists of an HPLC but with a mass spectrometer (MS) replacing the UV detector. LC/MS is the most sensitive and selective testing system available on a commercial scale, delivering
 

accurate quantitative results in complex sample matrices.

- FT-IR:** a well-established analytical technique that can deliver quantitative and semiquantitative information about a sample. FT-IR involves the transmission of infrared energy through a refined sample like an oil, powder or concentrate, and is a quick and simple technique for use on non-complex samples at relatively higher concentrations. It requires little to no sample preparation and enables labs to identify the four major cannabinoids in under a minute.



## Criteria for selecting instrumentation

The testing technology and instrumentation are dependent upon your commercial model, business goals and type of laboratory set-up you have.

If you are a start-up laboratory, grower, extractor or manufacturer with small batch-processing needs, HPLC is the most widely used technology for this use case, and the Agilent Infinity II 1220 LC is ideal entry level system for your purpose. For high-throughput laboratories and cannabinoid researchers that need to identify hundreds of cannabinoids and many other endogenous chemicals, LC/MS is the answer. The Agilent InfinityLab LC/MSD iQ reduces false positives, offering a higher degree of confidence in results. The Agilent Cary 630 FT-IR spectrometer is used for relatively simple direct testing of the four major cannabinoids within processed samples.

## Think two steps ahead

When selecting instrumentation for testing cannabinoids, one should consider the high costs

<https://explore.agilent.com/cannabissol>



Agilent products and solutions are intended to be used for cannabis quality control and safety testing in laboratories where such use is permitted under state/ country law.

of setting up a cannabis-testing laboratory and the wide array of choices can sometimes lead lab owners to make short-term, low-cost purchasing decisions. Common errors include buying unreliable used equipment and/or implementation of poorly defined methodologies.

Think in terms of ‘able’ methods: affordable, achievable, reliable and repeatable. Other

important decisions include the available lab bench space, data processing, consumables, scientific consulting, education and ongoing support. Finally, laboratories need partners with established track records to help install the equipment and establish workflows that enable labs to achieve results over the long term. ●

#### Comparing HPLC, LC/MS and FT-IR methods for cannabis potency testing

	HPLC	LC/MS	FT-IR
Average test time	5–20 minutes	5–20 minutes	About 1 minute
Number of cannabinoids identified	All cannabinoids	All cannabinoids	Four major cannabinoids
Type of sample	All cannabis, hemp, and cannabinoid product matrices	All cannabis, hemp, and cannabinoid product matrices	Clean matrix (oils, powders and extracts)
Footprint and portability	2–6ft <sup>2</sup> . Typically stationary	6–12ft <sup>2</sup> . Typically stationary on a 6x3ft bench	Portable, suitcase-sized self-contained unit
Set-up and results	Expert installation required	Expert installation required	Expert (custom) model building required
Agilent instrumentation	Agilent Infinity II 1220 HPLC  Agilent Infinity II 1260 HPLC	Agilent InfinityLab LC/MSD iQ	Agilent Cary 630 FT-IR spectrometer