

EXTRACT



With no federal guidelines, here's how scientists are attacking marijuana safety testing

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Federal agencies like the Environmental Protection Agency and the Food and Drug Administration set safety guidelines outlining acceptable pesticide use for most crops intended for human consumption. But not for cannabis.



(Photo credit: Chris Hondros/Getty Images)

A federal oversight vacuum

Like any agricultural commodity, cannabis is vulnerable to attacks from pests and pathogens, and some growers use insecticides, fungicides and other crop protection agents to guard against these destructive elements. Unfortunately, many crop protection agents can contaminate cannabis and create health risks for consumers.

Cannabis grown outdoors may also be contaminated by soil used for previous agricultural operations; it may be exposed to pesticides drifting from adjacent fields; and the plant may even take up toxic metals from the soil, according to cannabis testing laboratory Steep Hill.

Cannabis extracts are also at risk of contamination from solvents used in the extraction process, such as butane.

Products intended for human consumption typically must undergo safety testing to minimize the risk of contamination from pesticides, microbes, toxins or residual solvents. Such testing is particularly relevant for cannabis because the plant is often used for medical purposes by people with compromised immune systems, who have an elevated risk of suffering negative health consequences due to contaminants.

But because marijuana is illegal at the federal level, there are no federal guidelines for acceptable levels of residual pesticides, molds, solvents or heavy metals. Without federal guidance, medical cannabis safety standards and consumer protections are left to state discretion.

To date, 28 states and the District of Columbia have legalized cannabis for medical use by qualifying patients, and eight states plus D.C. have legalized marijuana for adult recreational use.

Various states have implemented a patchwork of different requirements for compounds deemed safe and acceptable in medical and recreational marijuana products. Some states have implemented relatively strict testing regulations, while others have no cannabis testing laws on the books.

In Illinois, for example, all medical marijuana products and flowers must undergo lab testing for microbiological contaminants, mycotoxins, pesticide residues, residual solvents and active ingredient analysis before they may be sold to consumers. The state tightly regulates acceptable contaminant levels, and all products must be labeled with a list of active ingredients.

Meanwhile, Arizona's medical marijuana law requires no testing for cannabis contaminants.

Cannabis testing: Challenges and opportunities

"The challenge for analytical companies that are trying to serve this industry is that every state has different requirements and different compounds and levels, and those are in flux," Dr. Julie Kowalski, a senior chemist at Restek Corporation, told attendees at the Analytical Cannabis Symposium at Pittcon 2017 in Chicago this March.

"Cannabis is also highly complex," Kowalski explained. "Anything that's considered a dry commodity, in and of itself, is considered complex. So things like spices, teas and tobaccos would be similar. But at the same time, cannabis has its own special challenges. One of the things is just the natural variation."

There are different types of cannabis plants and a multitude of different strain varieties. Then, there's the added complexity of testing various cannabis product forms, including edibles, concentrates and flower material.

Because cannabis testing requirements between states aren't standardized and cannabis is a relatively complex commodity to test for contaminants, one approach to testing that scientists like Kowalski utilize is something called multi-residue analysis.

This is a testing method where you screen a large number of different components, pesticides and varieties of cannabis.

"It's sort of a catch-all approach," she explained.

This method is commonly used in food safety labs because most of the pesticide violations in food aren't for high levels of approved pesticides. Most violations are for pesticides that aren't approved for a particular commodity. So, testing for a broad range of pesticide residues helps ensure you don't miss anything.

Speaking at the Analytical Cannabis Symposium, Dr. Scott Kuzdzal, director of marketing at Shimadzu Scientific Instruments, underscored the importance of standardized preparation methods for accurate cannabis testing.

"Quality control and processing and sample preparation are critical to getting an accurate result," Kuzdzal said. "The way that you preprocess those materials will affect your end result. Sample preparation will have more of an effect on the end result than the analytical testing does at the end."

Kuzdzal, who has a Ph.D. in analytical chemistry and served as a postdoctoral fellow at the Johns Hopkins University School of Medicine, explains that the tools used in cannabis testing are perfectly reliable if they're given reliable material to test.

Instruments used in cannabis testing are also used in clinical labs, environmental labs and food safety labs, so they're recognized testing tools. And they'll give reliable results so long as the testing material is preprocessed in a reliable and standard way, Kuzdzal said.

"So the big challenge is in standardizing the sample preparation and the methods and processing more so than it is on the instrument side," he said.

Shimadzu Cannabis Testing Solutions covers a broad range of applications for cannabis testing, from potency to pesticide screening, and is working to help automate the process of cannabis testing.

Shimadzu developed a cannabis analyzer for potency, which automates the process of cannabis potency testing. The company is also planning to launch analyzers for pesticides and other cannabis testing needs in the near future.

"What we found is that there are so many labs out there with different machines and methods, and we really wanted to standardize the methods and provide everything they need, so they can be much more consistent in the way they test," Kuzdzal said.

"This is the way that all hospitals work. They have analyzers. They don't just go out and buy a mass spectrometer and develop all the methods themselves."

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