

# Overcoming hurdles in cannabis and CBD testing

**Cannabis and CBD beverages, snacks and sweets – the next stage of product testing with automated workflows and intuitive analytical solutions.**

THE CANNABIS market may still be viewed as fairly young, but the sector is set to become one of the fastest growing markets in the coming decade. Food products ranging from baked goods and gummies, to beverages and snacks, are a big part of driving that growth. In fact, in 2020, it was reported in Canada that 48 percent of cannabis consumers had purchased cannabis edibles or drinks.<sup>1</sup>

Given the breakneck pace of the industry, the range of regulations across and within countries, and the sheer complexity of cannabis and hemp chemistries, it can be challenging for stakeholders to ensure that testing is not only accurate, but also consistent across the supply chain and in step with consumer demands.

As such, there is a growing need for novel, intuitive testing and analysis solutions that can help the industry ensure cannabis products are safe and high-quality.

New developments and other fresh approaches in testing and analysis technologies can help address this challenge; for example, the automation of workflows to improve data quality and laboratory throughput

for procedures such as pesticide residue and potency testing. In addition, custom formatted calibration standards and reagents made to complement existing standard operating procedures (SOPs) or cloud-based software solutions reduce the operator risk by creating a 'right first time' environment for procedural execution.

Below are a few best practice examples to consider.

## Automated pesticide testing

Certifying consistency in cannabis analysis starts at the very beginning, with thoughtful sampling and sample preparation prior to testing. As such, it is important for cannabis labs to ensure robust SOPs are created for cannabis products so that regulatory compliance is met.

Often overlooked, but always critical, is effective sample preparation. This is essential when conducting any form of analytical procedure in the lab. Prepping samples for analysis usually involves a multitude of steps, including, but not limited to, weighing,

grinding, extraction, vortexing, dissolution and filtering. For many labs, this multi-step process can lead to unnoticed errors which will go on to impact the analysis.

An industry first, fully automated pesticide testing workflow for cannabis has just been announced by PerkinElmer. This comprises the new Janus G3 420 liquid handler, existing QSight 420 LC/MSMS instrument, new ONE Pesticide<sup>420</sup> Reagent Kit, and new SOPs and SimplicityLab<sup>420</sup> software. The solution is designed to help labs improve their sample throughput and reduce human error, while achieving full regulatory compliance and accurate reporting, right from sample intake with barcoding, through to complete sample analysis and result tracking, and final COA report generation.

## Teasing out confusing cannabinoids with HPLC

Cannabis and cannabis food processors are not only focused on testing cannabis for the safety and quality of the crop itself, but also on all the compounds that can be extracted from it. Naturally occurring cannabinoids, the main

biologically active component of the cannabis plant, are of high interest to both scientific research and new product manufacturing. As well as the perceived therapeutic and medicinal purposes of THC, the industry has a strong focus on the other cannabinoid compounds. There are over 100 different cannabinoids, but cannabidiol (CBD) is of particular interest. CBD can make upwards of 25 percent of the cannabis cannabinoid content and it is thought not to have a psychoactive effect on the brain. However, research has shown that it could potentially be used medically for illnesses such as anxiety, depression, epilepsy and pain disorders.

For processors in the food and beverage markets, monitoring the concentration of cannabinoids is a key method to determine potency and ensure label claim accuracy. This can pose challenges for processors as cannabis food products are often high-sugar and high-fat materials, such as cookies and sweets, producing diverse and difficult to monitor analytical matrices.

For these edible products, high-performance liquid chromatography (HPLC) tools can separately quantify multiple cannabinoids without derivatisation, which is particularly useful as these products, typically, will be consumed without additional heating. At PerkinElmer, to assist processors and third-party labs, we have designed the Flexar HPLC solution for the chromatographic separation of key cannabinoids in several food matrices, using photodiode array (PDA) detection.

### Tackling contamination testing and meeting regulations with bespoke cannabis SOPs

Cannabis testing requirements vary by state, but most do require testing and labelling

for various contaminants, such as residual solvents, microbes, heavy metals and pesticides. Testing of cannabis and the products extracted from it is important for research, safety to ensure regulations are being followed, and to monitor end products.

Of these contaminants, testing for pesticides and mycotoxins can often prove particularly difficult for cannabis labs. Rules governing maximum residual limits (MRLs) of these constituents vary greatly and can cause headaches for labs looking to navigate the evolving regulatory landscape.

For example, Canada currently requires cannabis-based products to meet one of the most comprehensive pesticide regulations lists globally, with 96 pesticides tested to concentrations down to 20 parts per billion (ppb). Whereas, within the US, each of the states have different regulatory requirements.

For cannabis labs it is important to forge partnerships that can not only provide the right technology, but also guide them through the complex, confusing and often changing regulations. Understanding this need, PerkinElmer provides customers with user support through training and detailed SOP around compliance testing, product manufacturing, automated solutions and help with food safety and quality specifically to get the data they need. SOPs are provided for the streamlined solutions for all analytical techniques, such as the PerkinElmer HS-GC/MS headspace, which can be used to analyse terpenes and residual solvents in cannabis and CBD edibles and extracts.

### How to evolve with the rapidly growing industry

With the cannabis food industry still cutting its teeth, there can often be a lack of in-house

expertise around scientific testing in this specific area. The extraction procedures are complex and testing is not easy. Laboratory professionals need easy-to-use analytical technologies that can be automated for speed of analysis and to reduce the chance of human error or inaccurate results.

Outside of the regular challenges that laboratories face when testing cannabis, the worldwide coronavirus pandemic has also presented food and cannabis labs with further challenges. The capital financial markets, in general, have struggled, and start-up labs have especially found it difficult to get their laboratories going. To combat this, cannabis labs and processors need to team up with experienced industries and partners to make sure that they can get the most for their money during this challenging financial climate.

One of the main problems that cannabis labs face is the lack of simplicity and errors that can be introduced because of that. When looking at cannabis analysis, most problems occur during sample preparation due to the number of stages it involves. From receiving the samples, unboxing and storing, homogenising, weighing, diluting and filtering the samples. Any small error that occurs can have a big impact on the final data and quality.



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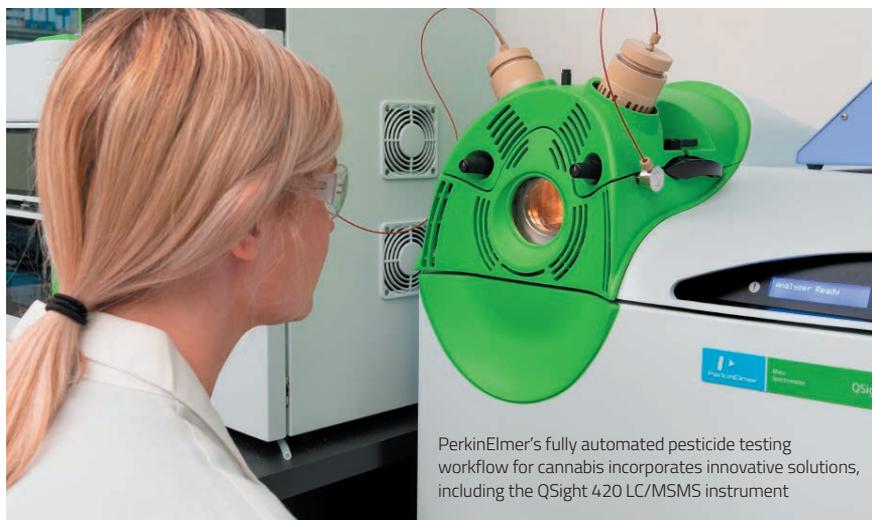
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Toby is focused on driving PerkinElmer's global cannabis and hemp

initiatives; including, but not limited to, new product development, collaborations with scientific thought leaders, market and technology research, and application and marketing development.

#### Reference

1. Health Europa, (<https://www.health.europa.eu/cannabis-edibles-are-leading-canadas-cannabis-market-in-2020/98093/>), Accessed 29th September 2020



PerkinElmer's fully automated pesticide testing workflow for cannabis incorporates innovative solutions, including the QSign 420 LC/MSMS instrument