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Application Report

Medicinal Cannabis Profiling

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Potency Testing in Cannabis

Cannabis consists of the dried flowers of the female Cannabis L-Sativa plant, also known as hemp or marihuana, and contains a number of active substances, including Delta-THC and Cannabidiol (CBD). The physical effects of Cannabis are largely the result of THC, but other Cannabinoids including CBD, may also influence the effectiveness of the drug. The chemical composition of the Cannabis determines the positive and negative effects of each dose. There are many different strains of Cannabis plant, all having varying ratios of the active compounds. Strains are cultivated through cloning and cross breeding of different plants to achieve a new strain with a desired flavour or percentage of Cannabinoid.

As Cannabis is a plant and not a chemically derived substance, it is very difficult to limit the presence of such a wide array of naturally occurring compounds and control content levels within any given dose.

The FDA has been involved with the medical and consumer communities in a lesser capacity, and has been highlighting the mislabelling of Medicinal Cannabis and its related products. In February 2015 the FDA issued six warning letters to suppliers of retail products claiming to contain various concentrations of CBD9.They noted that the analysed concentration of CBD for these products were often vastly lower than the amount declared on the label, some showing zero detectable amounts of CBD. The following year, a further 8 companies were added to this list of false advertisers. A study carried out by Vandrey et al. 10 looked at edible products available for purchase across a cross-section of U.S. metropolitan areas, and the results showed a large disparity between the declared CBD and Delta-THC content and the actual value - less than 50% of products sampled were labelled accurately. As these products are being consumed by ill and vulnerable patients, this inconsistency could result in a person receiving a minimal effect of treatment or conversely being overdosed and suffering potentially debilitating side effects. From a retail perspective, taxation of Cannabis products is calculated based on package size and not on the amountof activeingredientinthecontent.However,correct labelling is the only way for a patient to ensure they are receiving the correct dosage. Growers and dispensers need to protect themselves against future potential lawsuits – similar to the pharmaceutical industry, as well as protecting the consumer.

Potency testing evaluates the levels of each compound attributed to any health impact e.g. Cannabinoids – Delta- THC, Cannabinol (CBN) and Cannabindiol (CBD).

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GC Conditions

Injector Temperature (°C):	270
Detector Type:	FID
Detector Temperature	280°C
Carrier Gas Type:	Hydrogen
Constant Pressure:	9.3psi
Split Flow	70ml min^{-1}
Column Type	EL-5 30 m x 0.25 mm x 0.25µm
Initial Temperature	100°C (hold for 2 mins)
Ramp 1	30 °C min^{-1} to 200 °C
Ramp 2	10 °C min^{-1} to 270 °C (hold for 3 mins)

Results

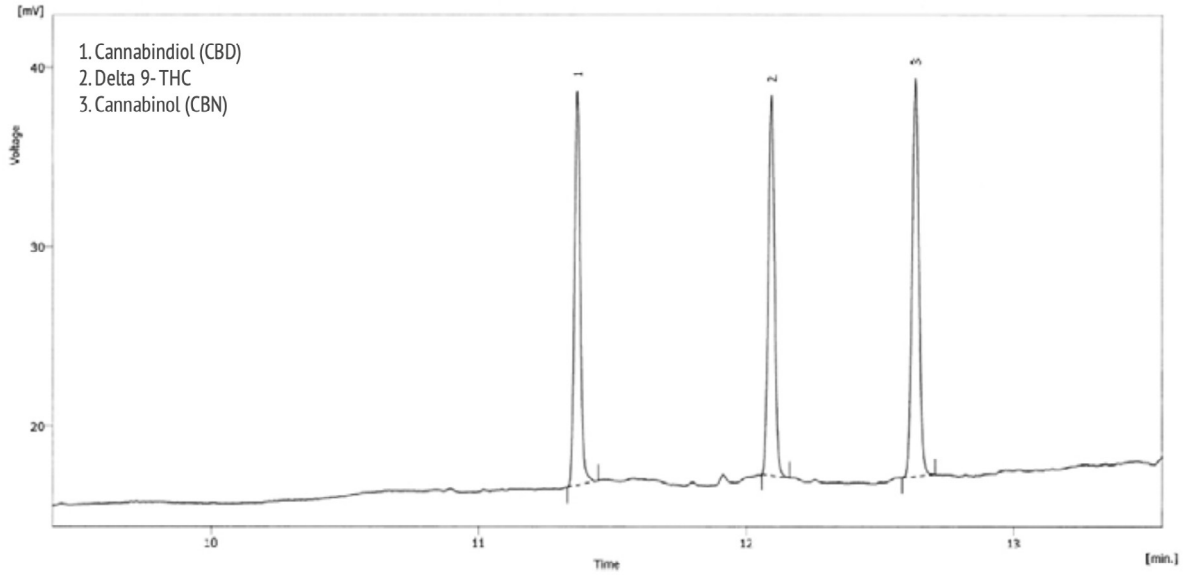

Figure 1 - A 1.0 uL injection of 250 ppm Cannabinoid mix standard

Potency in Cannabis was tested by using a readily available standard to show that the compounds can be clearly and easily detected when using an Ellutia 200 Series Gas Chromatograph.

A liquid sampling technique was used when testing for potency. The molecule sizes and volatility are very varied, and as a consequence of this, liquid sampling is the most efficient and easiest technique to use. We have found that using a headspace prevents the sample from being fully represented.

The samples were placed in an EL3000A liquid autosampler, and then it was left to run. The 200 Series Gas Chromatograph with an FID (Flame Ionisation Detector) analysis condition are shown on the left. The GC and Autosampler forms an efficient, time saving and cost effective combination. As shown in figure 1, all components normally found when testing potency were detected.

Equipment Used

Main Instruments

200 Series GC with FID
Part no. 20500130

Ellution Software
Part no. 23001001

Colibrick
Part no. 23001022

EL 5 30 m x 0.25 mm x 0.25 µm column
Part no. 51100157

Liquid Autosampler

Ellutia EL3100A - Automatic Liquid Sampler - 15 position
Part no. 30500011

Ellutia EL3000A - Automatic Liquid Sampler - 121 position
Part no. 30500010

GC Mounting Kit for EL3100A/ EL3000A Autosampler
Part no. 30500018

Accessories

7000 Series Flowmeter
Part no. 21007000

5µl Syringe
Part no. 20511202

2ml Short-cap Screw Thread Vials
Part no. 20511101

Pre-assembled Short Blue Screw Vial Closures
Part no. 20511102

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For more information on this application, equipment used or ordering, please visit: www.ellutia.com or scan the QR code below

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