



## B12 Cannabinoid Content in Commercially Available Oils

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**Learning Overview:** After attending this presentation, attendees will better understand a method used to analyze the Cannabidiol (CBD) content in seven commercially available oils.

**Impact on the Forensic Science Community:** This presentation will impact the forensic science community by demonstrating a quantitative analysis of commercially available cannabinoid products using Gas Chromatography (GC) and Mass Spectrometry (MS).

CBD is a non-psychoactive component found in *Cannabis sativa* (hemp), typically extracted from the plant via supercritical CO<sub>2</sub> extraction.<sup>1</sup> The Farm Bill of 2018 saw the legalization of CBD derived from hemp with less than 0.3% THC content by dry weight in the United States. CBD can now be purchased in tincture, oil, capsule, topical, and edible forms from local stores, in addition to online. In Florida, the sale of hemp products, which includes CBD oils, was recently legalized with SB 1020. SB 1020 mandates that all CBD products be tested by an independent laboratory and have this analysis available on the product packaging, but many of the samples obtained lacked this information. However, many of these products contain Tetrahydrocannabinol (THC), a schedule I drug under the Drug Enforcement Administration (DEA), which poses the question of how hemp products are regulated. In addition, there is no Food and Drug Administration (FDA) regulation for most of the manufacturers of these products, and no way to know if the manufacturers' claims of THC and CBD concentrations are legitimate. This project looks at seven commercially available CBD tinctures and analyzes the advertised CBD concentration compared to the concentration found via GC analysis.

An extracted solid CBD sample was obtained from Extract Labs™ and determined to be of pure quality by Botanacor, a third-party lab, and in-house via melting point analysis (66.5–67.3°C) and GC-MS. A seven-point calibration curve was made with this standard in a solvent of 9:1 hexane: 2-propanol. Initial quantitation on seven CBD tinctures was performed based on this curve. Tinctures were obtained from Tampa Bay, FL, area shops and online. Matrices were Extra Virgin Olive Oil (EVOO), glycerin, and Medium-Chain Triglycerides (MCT) (coconut oil). The glycerin samples were diluted in 2-propanol, and EVOO and MCT were diluted in the 9:1 hexane:2-propanol solution. The samples were then run on Thermo Scientific™ Trace GC Ultra GC/Flame Ionization Detector (FID) with dichloromethane as the wash solvent to minimize carryover. After quantitation, the calculated concentrations of each tincture were compared to the advertised concentration. The lab analysis data was also reviewed, if available from the manufacturer of the tincture.

Initial data suggest that five of the samples have a lower CBD concentration than advertised, and two of the samples have a higher CBD concentration than advertised. It is also suggested that some of the samples also contain THC. The initial data suggests that the manufacturers' advertisement of THC-free CBD tinctures is not accurate, both with the THC-free claim and the concentration advertised. Current work is focused on revising the quantitation method to better assess precision and robustness. Additionally, a separate MS-based method is being developed to quantitate the trace amounts of THC in the oils.

### Reference(s):

1. Pavlovic, Radmila, Giorgio Nenna, Lorenzo Calvi, Sara Panseri, Gigliola Borgonovo, Luca Giupponi, Giuseppe Cannazza, and Annamaria Giorgi. Quality Traits of 'Cannabidiol Oils': Cannabinoids Content, Terpene Fingerprint and Oxidation Stability of European Commercially Available Preparations. *Molecules* 23, no. 5 (May 20, 2018): 1230. <https://doi.org/10.3390/molecules23051230>.

### Cannabidiol, Cannabinoids, GC/FID