

Dosing Cannabis Accurately using a Vaporizer: White Paper

Enhancing Dose Uniformity and
Therapeutic Product Efficiency

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Abstract:

Patients are faced with a common question when using a vaporizer: When has my medicine been consumed? What am I leaving behind when I'm finished? What dose do I receive per draw?

MCR Labs found that the active cannabinoids were consumed after 40 draws, at a rate of 0.3 mg of THC per draw.

As medical cannabis moves into the mainstream, and as informed patients move toward vaporization as a preferred route of administration, we expect the use of vaporizing devices to increase significantly. Along with increased use comes an increase in demand for consumer information.



Introduction

Challenge: One of the most common questions that patients have when starting to use medical cannabis is how to properly dose. When has my medicine been consumed? What am I leaving behind when I'm finished? What dose do I receive per draw?

Patients currently use a qualitative approach, relying on smell, taste, and appearance. Because of the lack of information, patients have a choice to discard their remaining medicine, infuse it into edibles, or to keep vaporizing beyond the recommended usage times and conditions.

A quantitative cannabinoid profile provides a theoretical maximum dose contained in the product.¹ Bioavailability and pharmacokinetic data for various routes of administration are also available.² However, the efficiency of the use of the vaporization method is undetermined, yet is required for proper dosing.

Solution: MCR Labs provides patients with accurate dosing information that optimizes the efficiency of their medicine. To do so, we quantify the active ingredients remaining as a function of vaporization time and method for a specific vaporizer.

The experiments are designed to help patients better understand their cannabinoid intake when using a specific vaporizer, and to quantify the cannabinoids remaining in the plant matrix after use.

Case Study: Magic Flight Launch Box ®

To explore the dose provided and the cannabinoids remaining after use, we used a Magic Flight Launch Box® vaporizer and Mango, a *Cannabis indica* flower. We collected the cannabinoid profiles of the unused sample and of product remaining in the plant matrix after various usage times.



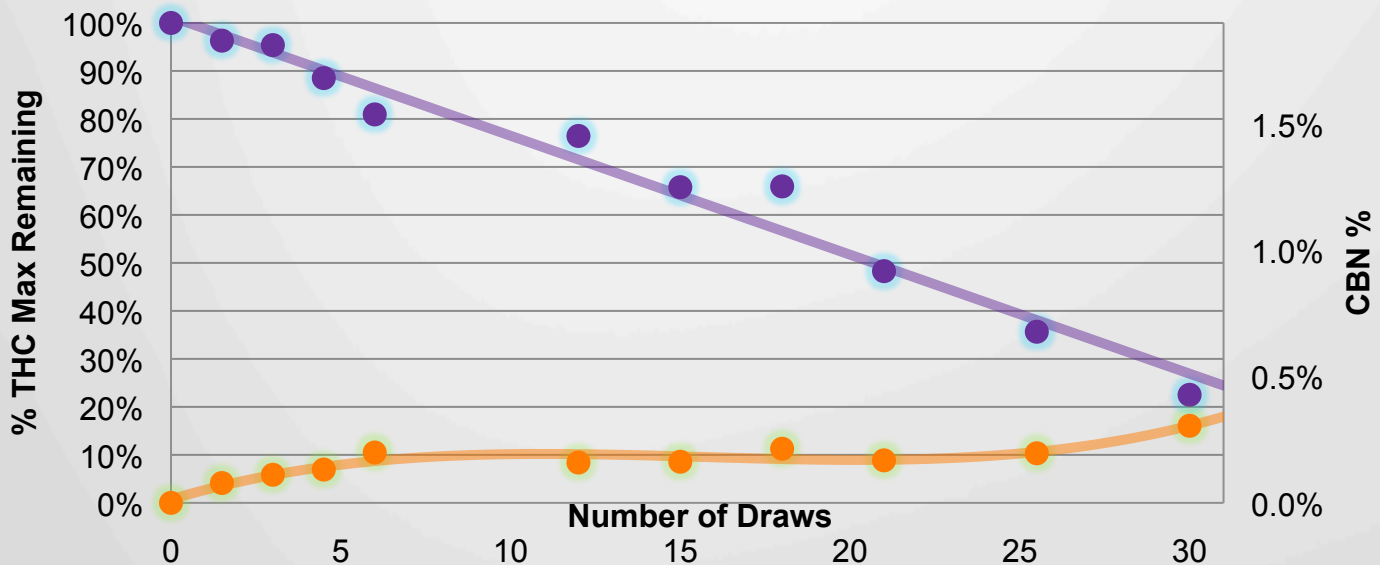
Procedure: The tests were performed in our laboratory under carefully controlled conditions. An outline of the procedure follows:

1. Ground cannabis flower product
2. Aliquot into approximately 100 mg portions
3. Take 10-second slow draws (as described in the Magic Flight manual)
4. After each time point, remove all remaining cannabis for quantitative profiling by high-performance liquid chromatography (HPLC) analysis

Results: We obtained cannabinoid profiles of the remaining product using our proprietary validated extraction and analytical methods. The tetrahydrocannabinol (THC) Max³ and cannabiniol (CBN) levels are plotted against number of draws – 10 seconds per the ‘slow draw’ method described in the Magic Flight instruction manual.

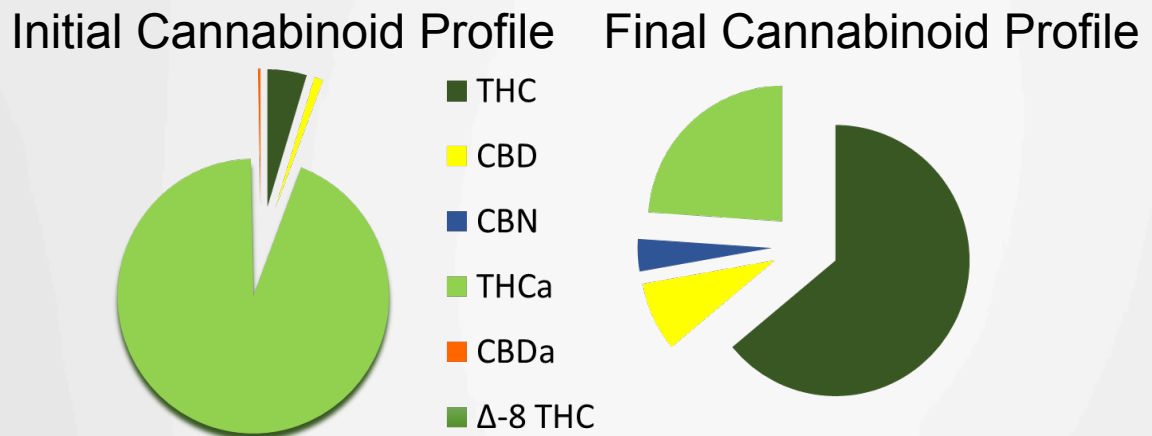
The results show a decline in THC Max in the product over the course of 30 ten-second draws, with a gradual increase in CBN levels. Photographs were taken of the remaining product after specified times to correlate visual appearance with analytical data.

Figure 1: Measure of remaining THC Max % and CBN % against number of draws



The cannabinoid profile of the product collected after 30 draws was significantly altered from the starting material profile. Tetrahydrocannabinolic acid (THCA) levels were significantly reduced and THC and CBN levels rose in the vaporized product, as shown:

Figure 2: Cannabinoid profile of Mango before and after 30 draws



Conclusions: MCR Labs performed controlled experiments designed to represent genuine consumer experiences with a vaporizer. The experiment yielded quantitative high-quality information indicating the composition of active ingredients remaining in cannabis as a function of vaporizer draws. This information, combined with product data supplied by a testing laboratory, provides consumers with the knowledge required to optimize both the efficiency and consistency of dosage regime.

Future experiments: Different starting cannabinoid levels, other cannabinoids, various vaporizer models, other usage techniques, and more will be explored.

References:

1. For an example see dose calculator in any products found on mcrlabs.com/tested
2. McGilveray, I.J. Pain Research and Management, 2005 Autumn;10 Suppl A:15A-22A
3. THC Max is the theoretical maximum amount of THC. It is calculated as $\text{THC Max} = \text{THC} + 0.877 * \text{THCa}$

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About MCR Labs: MCR Labs is an ISO-17025 accredited research and testing organization known for superior quality, flexibility, and responsiveness. Our laboratories support the therapeutic cannabis community. Our scientists have multi-disciplinary expertise which includes analytical chemistry; cannabis and cannabis product testing for quality and safety; and analytical and formulation development services. MCR Labs has been proudly serving the cannabis community since 2013.



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The Science Behind the Medicine