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Using a technique called mass spectrometry, routinely used to accurately detect small molecules such as cannabinoids, measurements were taken to detect the presence of CBDA in the liver cells. Under the same conditions, CBDA was not detected with the standard hemp oil, yet was present in the cells with the 10xPURE hemp oil (Figure 3).

Liquid chromatography separates molecules based on their chemical properties and is routinely used in most cannabis testing labs to quality control their material. Using this method, the composition of the 10xPURE hemp oil and the standard hemp oil were tested. With the same amount of full spectrum CBD, we observed that the 10xPURE hemp oil contained significantly more CBDA (Figure 4 & Figure 5).

### How 10xPURE Oil affects absorption and stability of full spectrum CBD in hemp oil:

A recent exploratory scientific endeavor was conducted to research and assess the stability of CBD in 10xPURE hemp oil in comparison to standard hemp oil by examining the cells that metabolize the CBD molecules. The exploratory scientific endeavor was completed by CTFO to assess how 10xPURE affects absorption and stability of full spectrum CBD in hemp oil.

“Full spectrum CBD” is a generic term used in the industry that describes a semi pure mixture of cannabinoids but contains mostly CBD. When cannabinoids are ingested, they are circulated in the blood stream where they act on cell types that signal through cannabinoids.

When taken orally, the body ultimately discards cannabinoids through the liver (see *Pharmacokinetics and Metabolism of the Plant Cannabinoids, Δ9-Tetrahydrocannabinol, Cannabidiol and Cannabinol 2005*). Thus, CBD is ultimately processed by the liver and converted to a molecule called 7-OH-CBD. In this small exploratory scientific endeavor, CTFO assessed how liver cells respond to full spectrum CBD in 10xPURE hemp oil, versus hemp oil alone. Because CTFO has a forward-thinking mentality in cannabinoid/CBD supplement formulation, it was important to actively test the oil mixtures to record the bioavailability and cannabinoid solubility.

As displayed in Figure 1, this exploratory scientific endeavor demonstrated that liver cells were occupied by CBD in a similar manner between both the 10xPURE hemp oil and standard hemp oil.

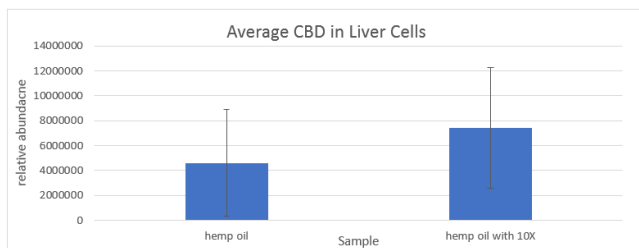


Figure1: Liver cell uptake of CBD

Furthermore, CBD was converted to 7-OH-CBD in a similar manner between both 10xPURE hemp oil and standard

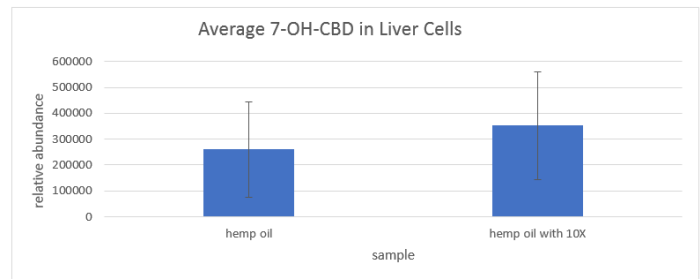


Figure2: Liver cell metabolism of CBD. 7-OH-CBD levels in Liver Cells.

hemp oil (Figure 2).

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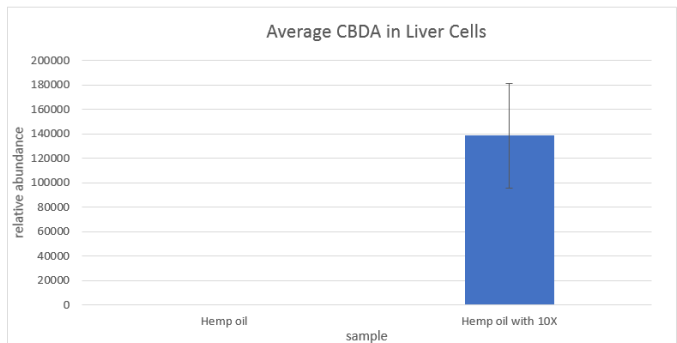


Figure3: CBDA uptake in Liver Cells

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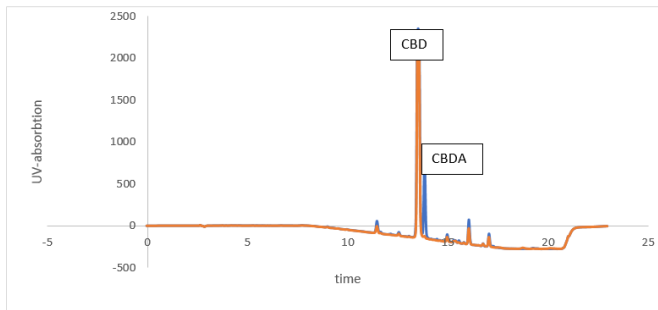


Figure 4 liquid chromatography of full spectrum CBD oil (orange) and full spectrum CBD oil with 10xPURE (blue)

tween both samples. However, in the full spectrum CBD with 10xPURE (blue) the trace has an extra peak. We determined that this extra peak is CBDA. This was not seen in the standard hemp oil sample during this experiment.

In the existing lab results comparison displayed in Figure 5, 30ml bottles of both standard hemp oil or and hemp oil extracted with 10xPURE were analyzed for CBD (blue) and CBDA (orange). Hemp oil with 10xPURE had a much greater proportion of CBDA (16mg per 30ml bottle) than standard hemp oil alone (3 mg per 30ml bottle), despite having similar levels of CBD (519 mg per 30 ml bottle with 10xPURE and 535 mg per 30 ml bottle without). This suggests that CBDA is more soluble with 10xPURE hemp oil.

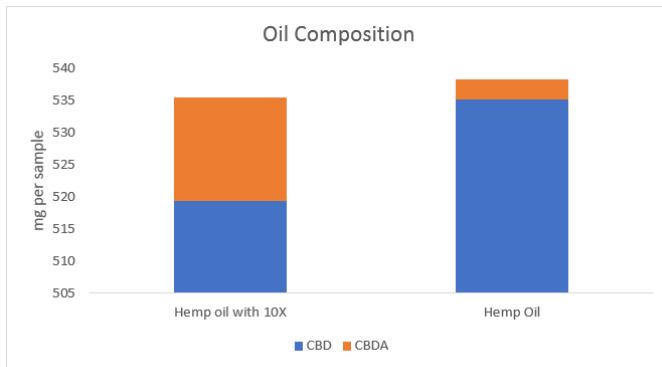


Figure 5 quantification of CBD and CBDA in hemp oil or hemp oil with 10xPURE

Continued testing and rigorous work is occurring by CTFO to determine if CBDA extraction is indeed enhanced with our 10xPURE hemp oil blend. Because CBDA may be more soluble in 10xPURE hemp oil versus standard hemp oil, this is a valuable discovery.

CBDA has been shown to be a potent anti-inflammatory, shown to reduce acute nausea, and has also been observed to inhibit breast cancer cell migration (see the scientific papers: *Cannabidiolic acid as a selective cyclooxygenase-2 inhibitory component in cannabis*. By Takeda S et al 2008, *Neuromotor tolerability and behavioural characterisation of cannabidiolic acid, a phytocannabinoid with therapeutic potential for anticipatory nausea*. By Brierley DI et al. 2016, and *Cannabidiolic acid, a major cannabinoid in fiber-type cannabis, is an inhibitor of MDA-MB-231 breast cancer cell migration*. By Takeda S et al. 2012).

The increase in the amount of CBDA in 10xPURE blends could potentially be a supporting factor in explaining why customers are giving personal anecdotes on the effectiveness of 10xPURE on in regards to treating their pain. In fact, analysis of hemp oil with 10xPURE was found to contain up to 5 times more CBDA than in standard hemp oil (Figure 5). CTFO is now exploring how 10xPURE hemp oil stabilizes this important molecule and how various ratios of CBD to CBDA influence its delivery into isolated cells.

Liquid chromatography separates molecules based off of their interaction with the chemical resin. Cannabinoids absorb UV light, therefore the greater the UV-absorbance (y-axis), the more cannabinoids are present. As displayed in Figure 4, the CBD is roughly the same height and width be-