Report

Determination of Cannabidiol (CBD) and other Cannabinoids in Coffee: Mass Transfer and Stability During and After Brewing

Client

CBD Health Collection
Rick Bauer

Testing Laboratory

Hocking College Cannabis Analytic Laboratory
226 Sylvania Avenue
Nelsonville, OH 45764

Study Director

Fred Claussen
Hocking College Cannabis Analytic Laboratory
740-753-6499
claussenf@hocking.edu

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Introduction:

The purpose of this study was to evaluate the concentration of CBD and other cannabinoids in brewed coffee at two water temperatures using a commercial pour over coffee dripper. Two coffee formulations containing a CBD concentrate at, nominally, 1,000 mg and 2,000 mg of Full Spectrum Concentrate per pound of ground coffee were evaluated. The data generated during this study will be used to determine the mass transfer of CBD and other cannabinoids from formulated coffee to the brewed product and the stability of CBD/cannabinoids in the brewed product over a 15-minute period following brewing.

Experimental Design and Results:

Analysis of Ground Coffee:
Two coffee samples were submitted for testing:

One Pound of *Jamaican Me Crazy* formulated with 1,000 mg of Full Spectrum Concentrate/pound

One Pound of *435°* formulated with 2,000 mg of CBD Full Spectrum Concentrate/pound

Prior to brewing experiments, each coffee sample was analyzed in duplicate for CBD and other cannabinoids by HPLC to establish accurate measured CBD/cannabinoid concentrations in each formulation. A total of 4 HPLC determinations were made.

Table 1. Cannabinoid Content of Ground Coffee Beans

Sample ID	CBD (mg/lb.)	CBG (mg/lb.)	CBGA (mg/lb.)	CBC (mg/lb.)	Δ9-THC (mg/lb.)
Jamaican Me Crazy	805	15	21	37	25
435°	1411	27	23	66	44

Reported results represent the means of duplicate determinations.

Brewing Experiments:
Brewing experiments were conducted using two water temperatures for each coffee formulation. Additionally, two separate brews were conducted at each of the two temperatures on each formulation. Coffee was brewed using a Hario V60 Coffee Dripper and Hario coffee filters.

The following experiment was conducted on each coffee formulation in duplicate at each of the two brewing temperatures (4 independent experiments). The coffee dripper components were cleaned before each experiment by rinsing with hot tap water followed by methanol.

1. Heated a suitable quantity of tap water to a stable temperature of 180 °F (82-83 °C) or 200 °F (93-94 °C)
2. Placed coffee dripper apparatus on top of a clean 500 mL glass graduate cylinder.
3. Placed a coffee filter in the dripper funnel. Pre-rinsed the filter by thoroughly wetting it with heated tap water. Allowed the water to stop dripping, then discarded the rinse water.
4. Weighed 25 g of ground coffee into a tared weigh boat on a precision balance and recorded the weight.
5. Transferred the weighed coffee to the dripper funnel.
6. Using a graduated cylinder, measured 350 mL (11.8 fl. oz.) of heated tap water.
7. Transferred about 100 mL of the measured water to the dripper funnel and allowed it to drain for about 1 minute.
8. Slowly added the remaining heated tap water and allowed time for the coffee to stop dripping from the funnel.
9. Recorded the total volume (mL) of brewed coffee in the graduated cylinder.
10. Immediately transferred the brewed coffee from the graduated cylinder to a clean ceramic coffee mug, then immediately removed an aliquot of the brewed coffee from the mug for CBD/cannabinoid analysis.
11. Removed additional aliquots of brewed coffee from the mug for CBD/cannabinoid analysis at 5-minutes, 10-minutes, and 15-minutes after brewing.

A total 16 HPLC determinations were made.

Results for CBD determinations in the brewed coffee samples appear in Table 2. No other cannabinoids were detected in the brewed coffee samples.

Table 2. CBD Concentrations in Brewed Coffee

Sample ID	Description	CBD (mg/11.8 oz Brew)	CBD Theoretical Amount (mg/11.8 oz Brew)	Percent of Theoretical
Jamaican Me Crazy	Brewed Coffee (0 min.)	0.372	44.3	0.841
Jamaican Me Crazy	Brewed Coffee (5 min.)	0.411	44.3	0.929
Jamaican Me Crazy	Brewed Coffee (10 min.)	0.439	44.3	0.992
Jamaican Me Crazy	Brewed Coffee (15 min.)	0.364	44.3	0.822
435°	Brewed Coffee (0 min.)	0.590	77.8	0.758
435°	Brewed Coffee (5 min.)	0.524	77.8	0.675
435°	Brewed Coffee (10 min.)	0.646	77.8	0.831
435°	Brewed Coffee (15 min.)	0.504	77.8	0.648

Reported concentrations represent the mean of duplicate determinations.

The reported results for CBD indicate little mass transfer of CBD from the ground coffee to the brewed product. In all experiments, less than 1% (percent of theoretical) of the CBD in the ground coffee was transferred to the brewed product. CBD in the brewed product appeared to be stable for 15 minutes after brewing.

Report Approval:

Fred Claussen 10/28/20

Fred Claussen
Study Director

Date