

# Determination of Cannabinoids in Topicals using HPLC from CTInstruments

Accurate determination of cannabinoids in topicals is important from pricing, quality assurance, and regulatory compliance point of view. We present an easy-to-use, accurate, reliable, and affordable HPLC for measuring 11 cannabinoids in a variety of samples. This application note describes analysis of cannabis edibles.

## HPLC Features

- Reciprocating Pump
- Rheodyne 7725i Injector
- CTI HPLC Software
- UV/VIS Detector
- Temperature-controlled Column Compartment

## HPLC Specifications

Flow Rate	0.001 - 5mL/min
Max Pressure	6,300 psi
Flow Accuracy	±1%
Flow Precision	RSD <0.1%
Qualitative Repeatability	RSD ≤0.2% (Naphthalene/ Methanol standards)
Quantitative Repeatability	RSD ≤0.5% (Naphthalene/ Methanol standards)
Wavelength Range	180 - 680nm
Spectrum Bandwidth	8nm
Wavelength Accuracy	±1nm
Wavelength Precision	Below 0.1nm
Noise	≤0.25X10 <sup>-5</sup> AU

## HPLC Column Specifications

Column Type	C18, SS body
Dimensions	150x4.6mm
Packing	5µm particles
Guard Column	C18



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## Sample Information

Sample Type	Topical Stick
Brand	ACTIVE RELEAF+ STICK—Extra Strength 15 grams
Total THC per Unit	0 mg
Total CBD per Unit	100 mg



## PROCESS

### 1. Extraction

Extraction of cannabinoids from topicals is the initial step in the analysis.

#### Extraction Parameters

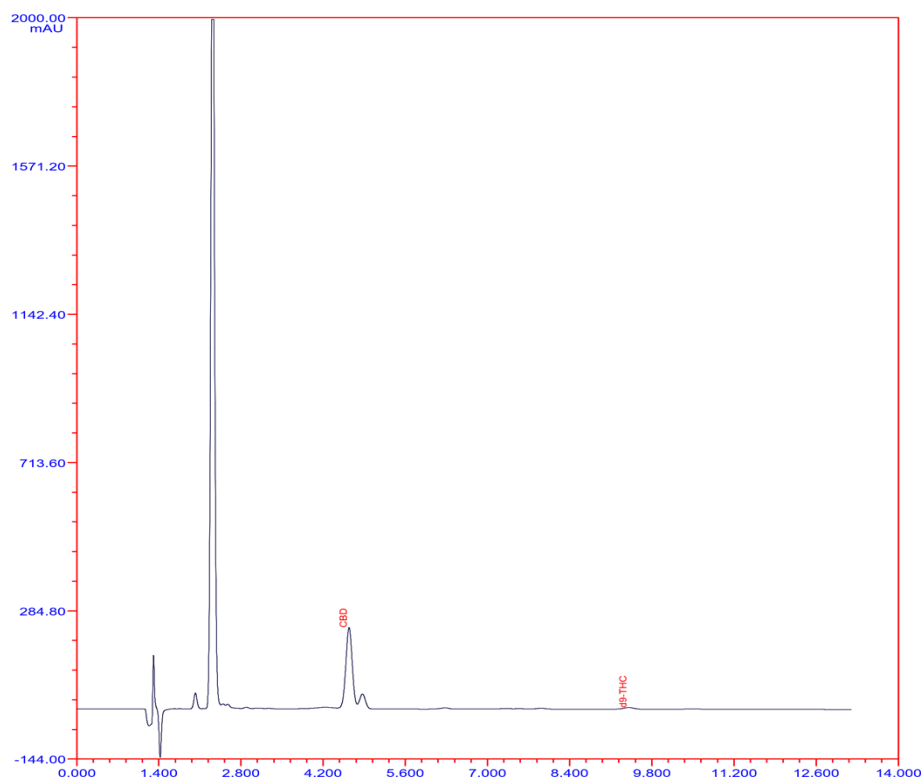
Sample Weight	70 mg
Sample Preparation	sonication
Extraction Solvent	acetonitrile
Extraction Conditions	room temperature
Dilution	in acetonitrile

### 2. Injection and HPLC Analysis

After the extraction is completed, diluted extract is injected into HPLC for analysis.

#### Chromatographic Conditions

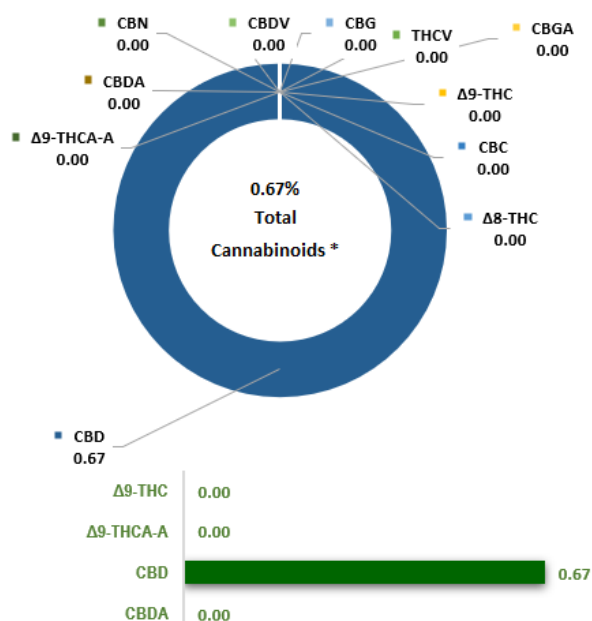
Mode	Isocratic
Temperature	30°C
Detection	UV at 220nm
Mobile Phase	Buffer:Acetonitrile
Flow Rate	1.2mL/min



### 3. Report Generation

After the analysis is completed, CTI HPLC software auto-processes the chromatogram, followed by export to custom lab report generation program in MS Excel (highly customizable and automated report generation for ease of use).

#### CANNABINOID PROFILE



Compound		Result (% w/w)	mg/gram of sample
THCV	Tetrahydrocannabivarin	NR	NR
Δ8-THC	(-)-Δ8-THC	NR	NR
Δ9-THC	(-)-Δ9-THC	<0.01	<0.05
Δ9-THCA-A	(-)-trans-Δ9-THC acid A	NR	NR
CBD	Cannabidiol	0.67	6.73
CBDA	Cannabidiolic acid	NR	NR
CBDV	Cannabidivarin	NR	NR
CBG	Cannabigerol	NR	NR
CBGA	Cannabigerolic acid	NR	NR
CBN	Cannabinol	NR	NR
CBC	(+/-) Cannabichromene	NR	NR
<b>Total Cannabinoids *</b>		<b>0.67</b>	<b>6.73</b>
Total Potential THC		<0.01	0.04
Total Potential CBD		0.67	6.73
Total Potential CBG		<0.01	<0.04

#### Results

	Manufacturer's Values	Measured Values
<b>Total THC per Unit</b>	0 mg	0.60 mg
<b>Total CBD per Unit</b>	100 mg	100.95 mg

#### Lower Limit of Quantification (LLOQ)

The lower limit of quantification (LLOQ) is the lowest amount of a cannabinoid in a sample that can be quantitatively determined with suitable precision and accuracy using the corresponding method and dilution rates. All values below this threshold are reported as NR - None Reported.

Compound	LLOQ (% w/w)
THCV	0.01
Δ8-THC	0.01
Δ9-THC	0.01
Δ9-THCA-A	0.01
CBD	0.01
CBDA	0.01
CBDV	0.01
CBG	0.01
CBGA	0.01
CBN	0.01
CBC	0.01

Date of Quality Control	Standard	Standard Concentration (ug/mL)	Measured Concentration (ug/mL)	Delta (%)	PASS/FAIL	Notes
28-Jan-21	Benzoic acid	1002.9	1013.0	1.0%	PASS	
28-Jan-21	CBD	100.5	103.4	2.9%	PASS	