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Determination of Cannabinoids in Beverages using HPLC from CTInstruments

Accurate determination of cannabinoids in beverages 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^{-5}AU

CTInstruments Ltd.
Commercial Cannabis Awards 2020
Best Cannabinoids Potency Testing Solutions Manufacturer - North America

2020 COMMERCIAL CANNABIS AWARDS WINNER

Best Cannabinoids Potency Testing Solutions Manufacturer - North America

cannabishplcanalyzer.com

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	sparkling water—269 mL
Brand	everie Lemon & Lime Sparkling Beverage 269 mL
Total THC per Unit	<0.05 mg
Total CBD per Unit	10 mg

PROCESS

1. Extraction

Extraction of cannabinoids is the first step in the analysis of samples containing cannabinoids. As beverages already have cannabinoids dissolved, they are injected directly without extraction or dilution.

Extraction Parameters

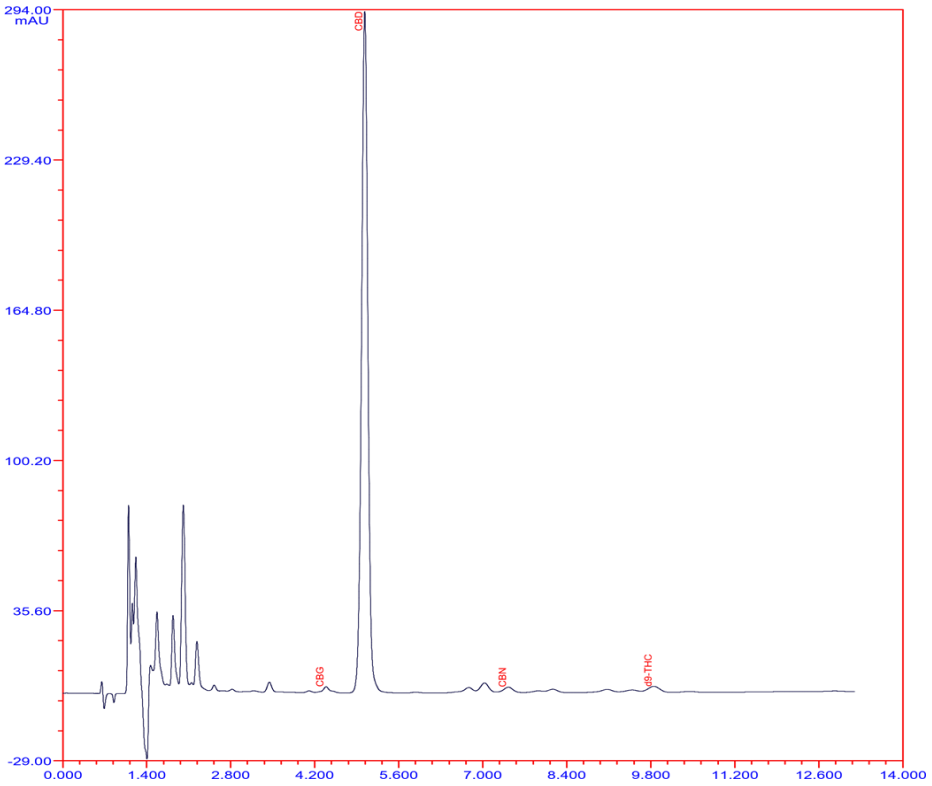
Sample Weight	20 uL
Sample Preparation	none
Extraction Solvent	none
Extraction Conditions	none
Dilution	none

2. Injection and HPLC Analysis

Beverage is injected into HPLC for analysis without dilution.

Chromatographic Conditions

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



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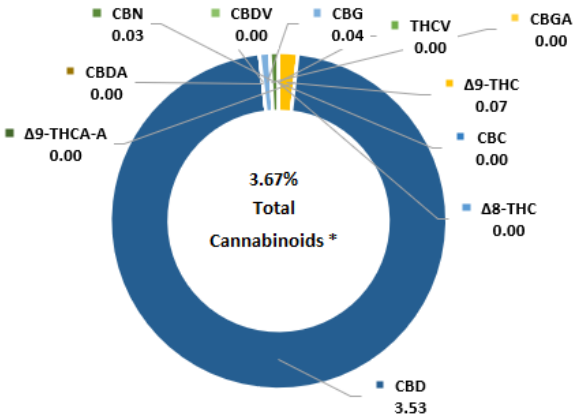
3. Report Generation

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 — Beverage Product Volume = 269 mL



Compound		Result (%, w/w)	mg/sample volume
THCV	Tetrahydrocannabivarin	0.00	0.00
Δ8-THC	(-)-Δ8-THC	0.00	0.00
Δ9-THC	(-)-Δ9-THC	0.07	0.18
Δ9-THCA-A	(-)-trans-Δ9-THC acid A	0.00	0.00
CBD	Cannabidiol	3.53	9.50
CBDA	Cannabidiolic acid	0.00	0.00
CBDV	Cannabidivarin	0.00	0.00
CBG	Cannabigerol	0.04	0.10
CBGA	Cannabigerolic acid	0.00	0.00
CBN	Cannabinol	0.03	0.08
CBC	(+/-) Cannabichromene	0.00	0.00

Total Cannabinoids *	**3.67**	**9.86**
Total Potential THC	0.07	0.18
Total Potential CBD	3.53	9.50
Total Potential CBG	0.04	0.10

Results	Manufacturer`s Values	Measured Values
Total THC per Unit	<0.05 mg	0.18 mg
Total CBD per Unit	10 mg	9.50 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	Tetrahydrocannabivarin	0.01
Δ8-THC	(-)-Δ8-THC	0.01
Δ9-THC	(-)-Δ9-THC	0.01
Δ9-THCA-A	(-)-trans-Δ9-THC acid A	0.01
CBD	Cannabidiol	0.01
CBDA	Cannabidiolic acid	0.01
CBDV	Cannabidivarin	0.01
CBG	Cannabigerol	0.01
CBGA	Cannabigerolic acid	0.01
CBN	Cannabinol	0.01
CBC	(+/-) Cannabichromene	0.01

Inst

Date of Quality Control	Standard	Standard Concentration (ug/mL)	Measured Concentration (ug/mL)	Delta (%)	PASS/FAIL	Notes
4-Apr-21	Benzoic acid	1002.9	1007.0	0.4%	PASS	
4-Apr-21	CBD	100.5	101.3	0.8%	PASS	