Profiling of 11 Cannabinoid Mixture by PBr HPLC column

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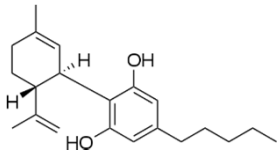
Introduction

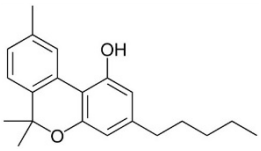
A mixture of 11 cannabinoids was separated under 14 minutes using isocratic MS-compatible mobile phases on a core-shell PBr HPLC column with UV detection. CBDV, THCV, CBDA, CBD, CBG, CBGA, CBN, D9-THC, D8-THC, CBC, and THC-A standards were mixed in a solvent of 1:1 water:methanol to a concentration of 9.1 mg/mL. 5mL injection volume was used to obtain the chromatogram. The isobaric D9-THC and D8-THC was baseline separated. The peak shapes are symmetrical for accurate quantification.

The pentabromobenzyl (PBr) core-shell HPLC column is a reversed-phase column with alternate selectivity to C18. Its separation mechanism is mostly through hydrophobic, p-p, and dispersion interactions, with little or no ion-exchange. PBr retains non-charged compounds stronger regardless of the polarity when comparing to C18. Consequently, PBr can be used as a robust alternative to HILIC for polar molecule analysis in reversed-phase. Further, PBr is useful in polar molecule preparative-scale purification due to high sample loading capacity in water.

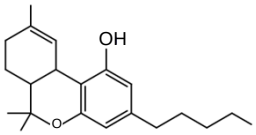
Cannabinoid Structures



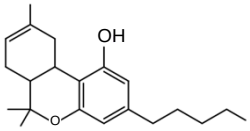
Cannabidiol (**CBD**)



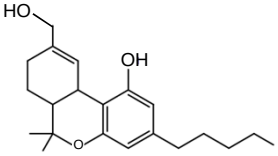
Cannabinol (**CBN**)



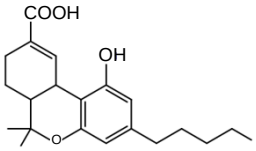
Δ9-Tetrahydrocannabinol (**Δ9-THC**)



Δ8-Tetrahydrocannabinol (**Δ8-THC**)



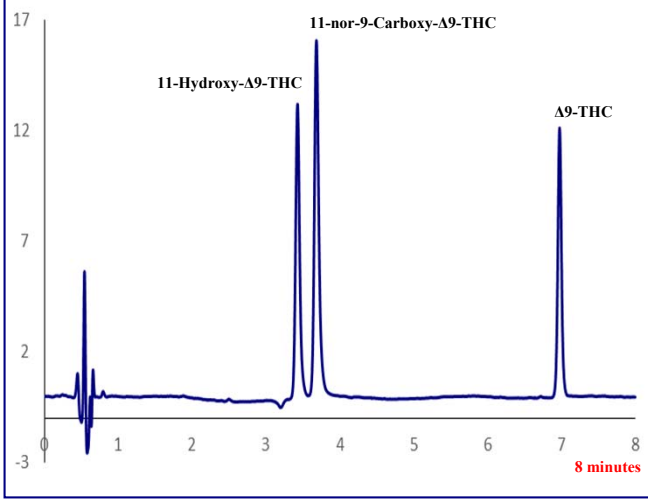
11-Hydroxy-Δ9-THC



11-nor-9-Carboxy-Δ9-THC

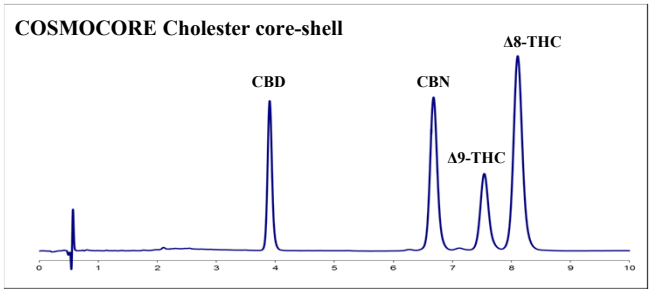
Δ9-THC Metabolites - 11-Hydroxy-Δ9-THC and 11-nor-9-Carboxy-Δ9-THC

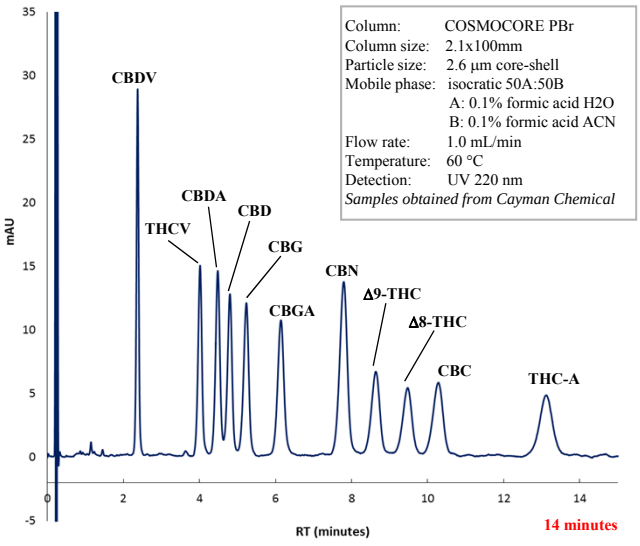
Columns: COSMOCORE Cholester
Column size: 2.1 mmI.D. x 100mm, 2.6 µm core-shell particles
Flow rate: 0.4 mL/min
Temperature: 30 °C
Detection: UV 220 nm
Mobile phase: linear gradient A: 0.1% acetic acid in H_2O B: acetonitrile
0min 45A:55B 8min 0A:100B
Data Process: Blank subtraction performed



Cannabinoid Mixture Separation

Columns: COSMOCORE Cholester
Column size: 2.1 mmI.D. x 100mm, 2.6 µm core-shell particles
Mobile phase: isocratic 35:65 0.1% acetic acid : acetonitrile
Flow rate: 0.4 mL/min
Temperature: 30 °C
Detection: UV 220 nm





Conclusion

- Simultaneous detection of Δ9-THC, 11-hydroxy-Δ9-THC and 11-nor-9-carboxy-Δ9-THC on one single gradient HPLC run
- COSMOCORE Cholester achieved baseline separation of the cannabinoid mixture in under 9 minutes using MS-friendly isocratic mobile phase
- COSMOCORE PBr separated 11 cannabinoids under 14 minutes in isocratic condition resulting in symmetrical peaks.
- Other geometric isomers can be separated by COSMOCORE Cholester, e.g. vitamin D_2 and D_3