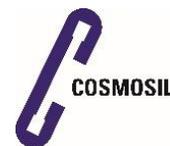


Differentiate $\Delta 9$ -THC from $\Delta 8$ -THC by Reversed-Phase Core-Shell HPLC Column



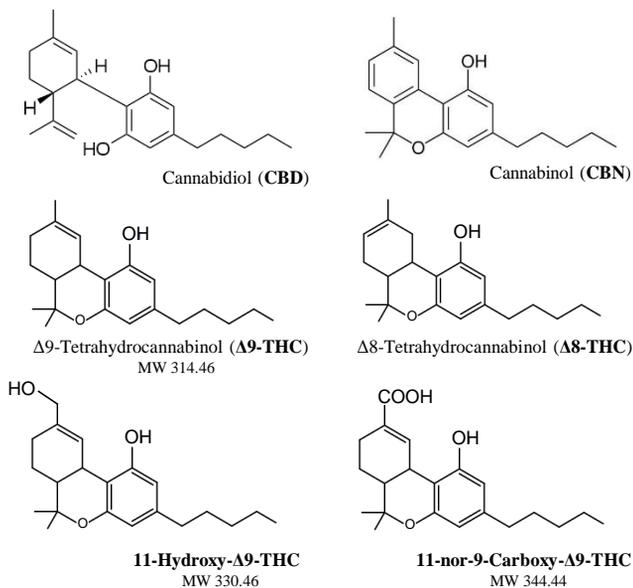
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Introduction

Of the roughly 80 cannabinoids, delta-9-tetrahydrocannabinol ($\Delta 9$ -THC) is the primary psychoactive molecule found in cannabis plants. In the first part of this study, $\Delta 9$ -THC and its metabolites 11-hydroxy- $\Delta 9$ -THC and 11-nor-9-carboxy- $\Delta 9$ -THC are detected using a simple HPLC gradient. In the second part of this study, delta-8-tetrahydrocannabinol ($\Delta 8$ -THC) and $\Delta 9$ -THC are baseline separated. $\Delta 8$ -THC is an isobaric isomer of $\Delta 9$ -THC that differs by the position of a double bond. It has lower psychoactive potency, more chemically stable, and potentially better medicinal properties than $\Delta 9$ -THC. Cannabinol (CBN) is used to monitor the freshness of the sample since $\Delta 9$ -THC easily oxidizes to CBN. Cannabidiol (CBD) has no psychoactive activity but it has many potent medicinal properties. These four cannabinoids, CBD, CBN, $\Delta 9$ -THC, and $\Delta 8$ -THC were analyzed by two different HPLC columns. The C18 column produced co-eluting peaks of $\Delta 9$ -THC and $\Delta 8$ -THC. The COSMOCORE Cholester has rigid cholesterol functional groups that produces higher steric selectivity to resolve $\Delta 9$ -THC and $\Delta 8$ -THC peaks. The peak shapes were symmetrical using MS-compatible solvents as the mobile phase.

Cannabinoid Structures

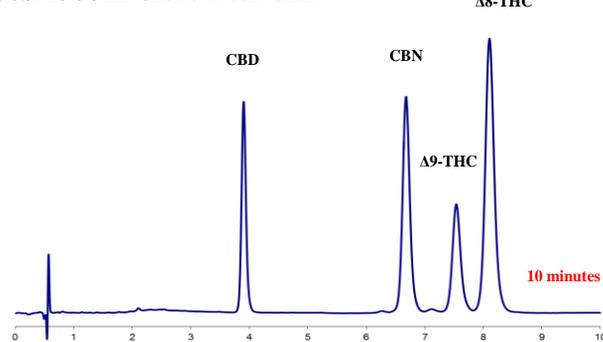


Cannabinoid Mixture Separation

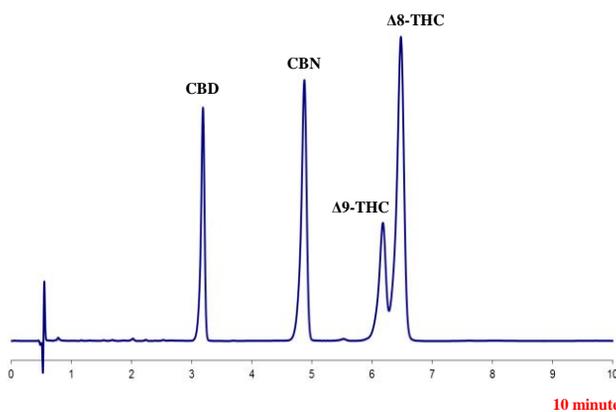
Columns: COSMOCORE Cholester vs. a popular-brand C18
 Column size: 2.1 mm I.D. x 100mm, 2.6 μ m core-shell particles
 Mobile phase: isocratic 35:65 0.1% acetic acid : acetonitrile
 Flow rate: 0.4 mL/min
 Temperature: 30 °C
 Detection: UV 220 nm



COSMOCORE Cholester core-shell

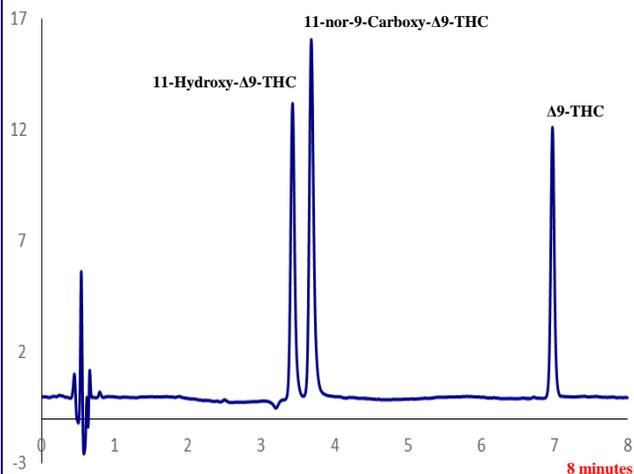


C18 core-shell



$\Delta 9$ -THC Metabolites - 11-Hydroxy- $\Delta 9$ -THC and 11-nor-9-Carboxy- $\Delta 9$ -THC

Columns: COSMOCORE Cholester
 Column size: 2.1 mm I.D. x 100mm, 2.6 μ m 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 H₂O B: acetonitrile
 0min 45A:55B 8min 0A:100B
 Data Process: Blank subtraction performed



Conclusions

- Simultaneous detection of $\Delta 9$ -THC, 11-hydroxy- $\Delta 9$ -THC and 11-nor-9-carboxy- $\Delta 9$ -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
- Because of the rigid cholesteryl functional group, COSMOCORE Cholester exhibits greater shape selectivity than C18 for geometric isomers
- Other geometric isomers can be separated by COSMOCORE Cholester, e.g. vitamin D₂ and D₃