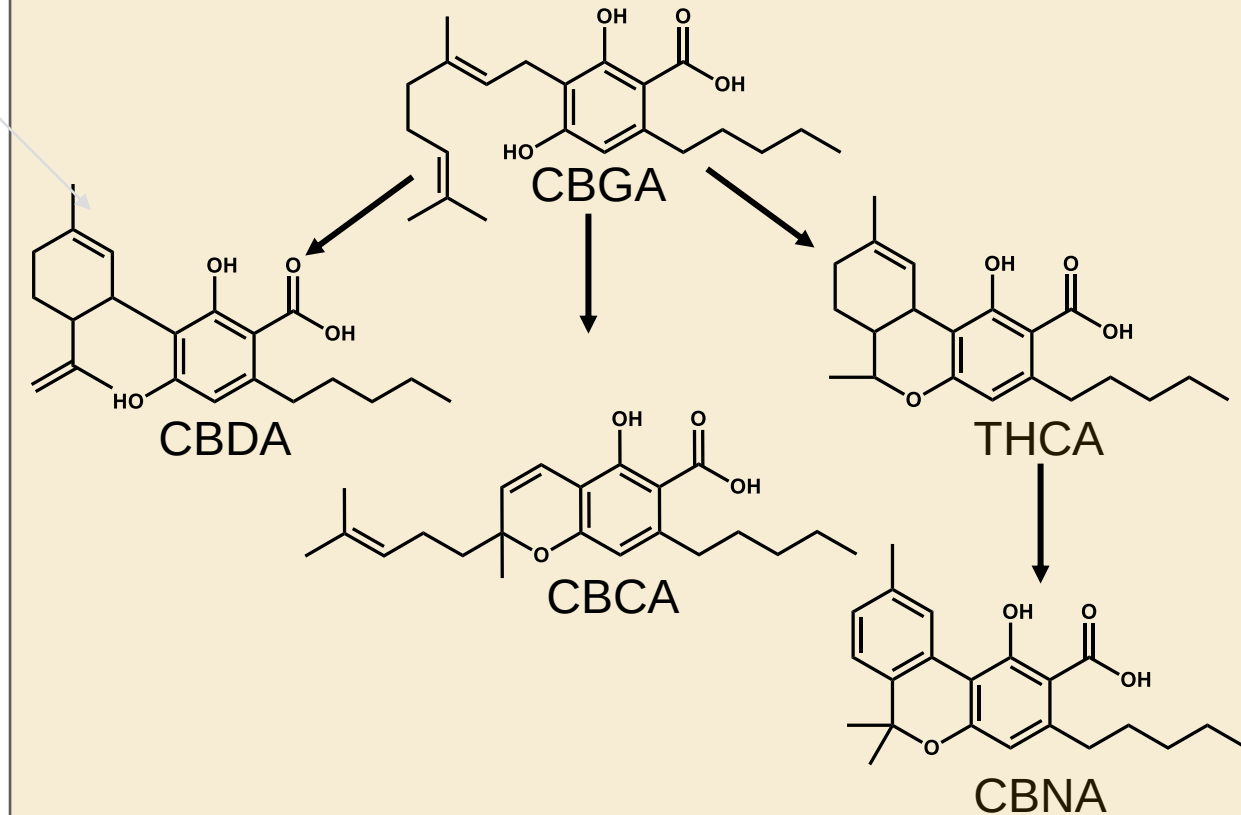
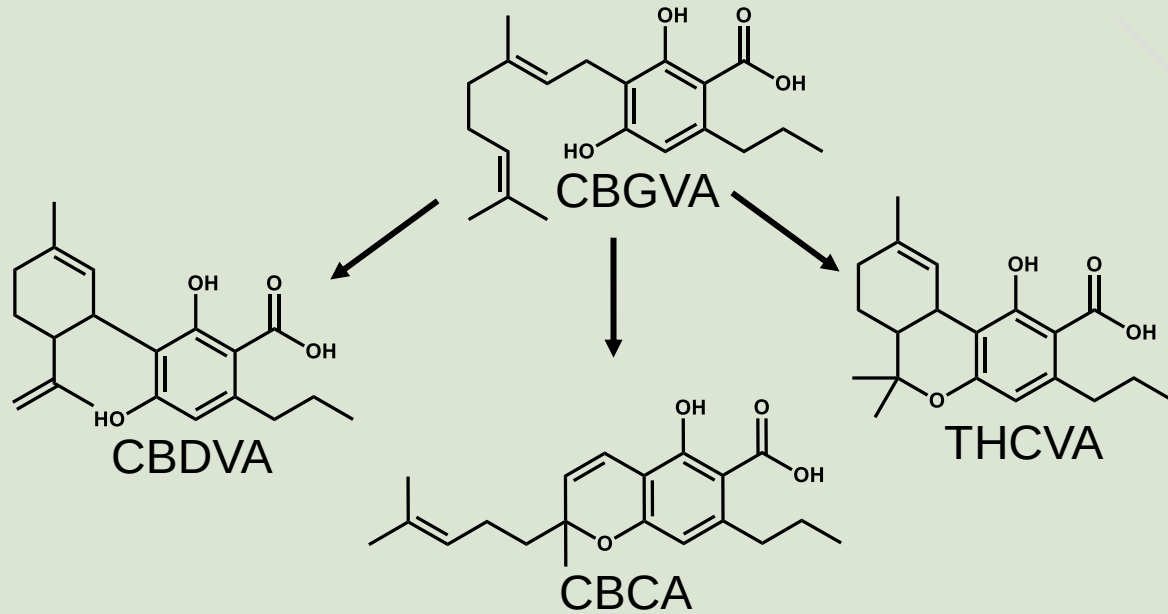
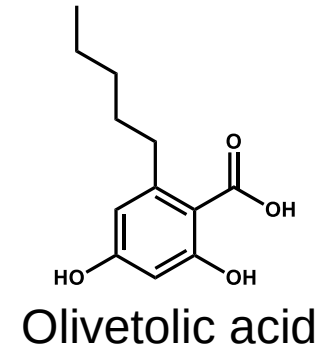
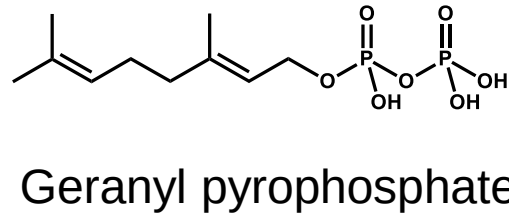
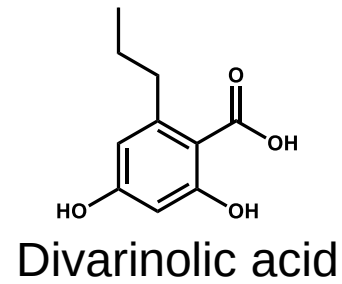




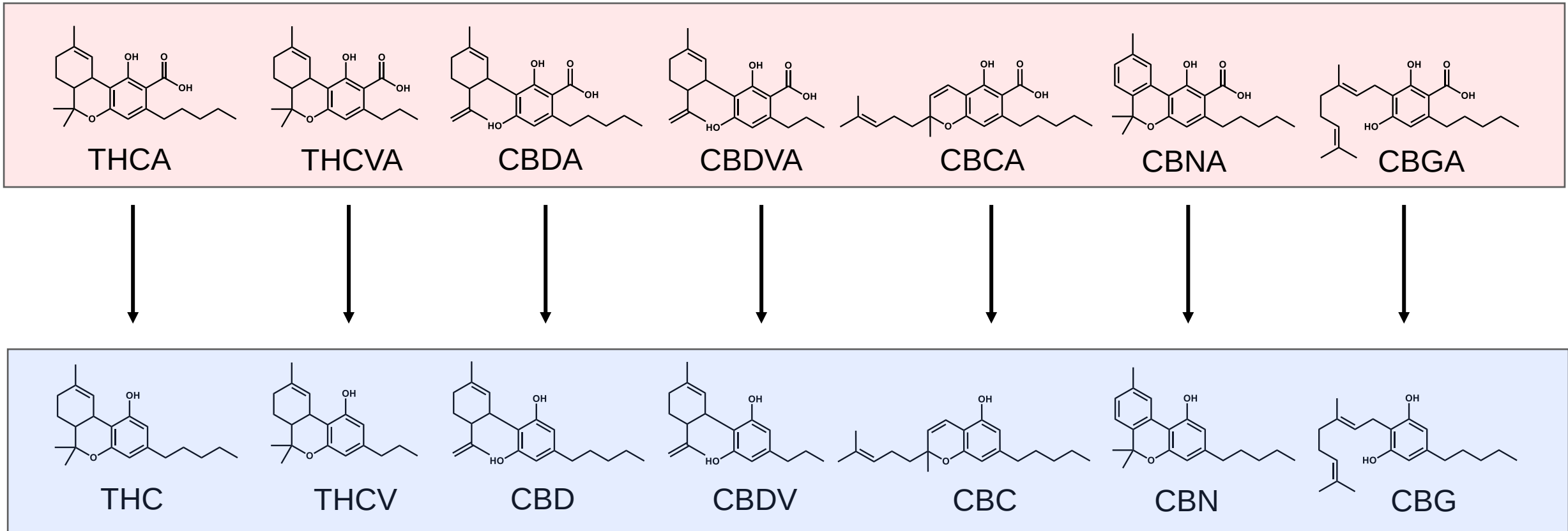
Single-Run Separation and Quantification of 14 Cannabinoids Using Capillary Electrophoresis

Emil A. Zaripov
September 27, 2023

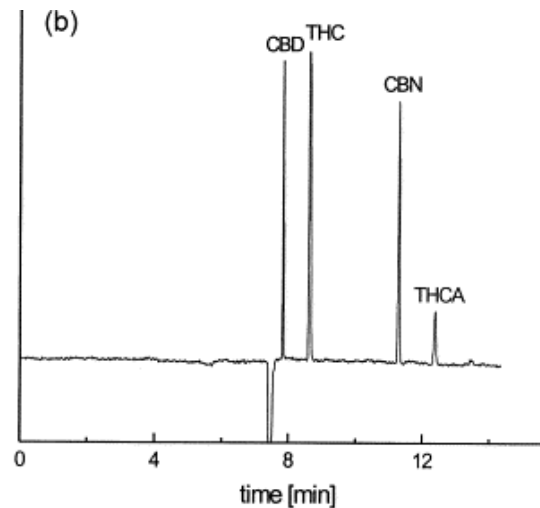
Biosynthesis



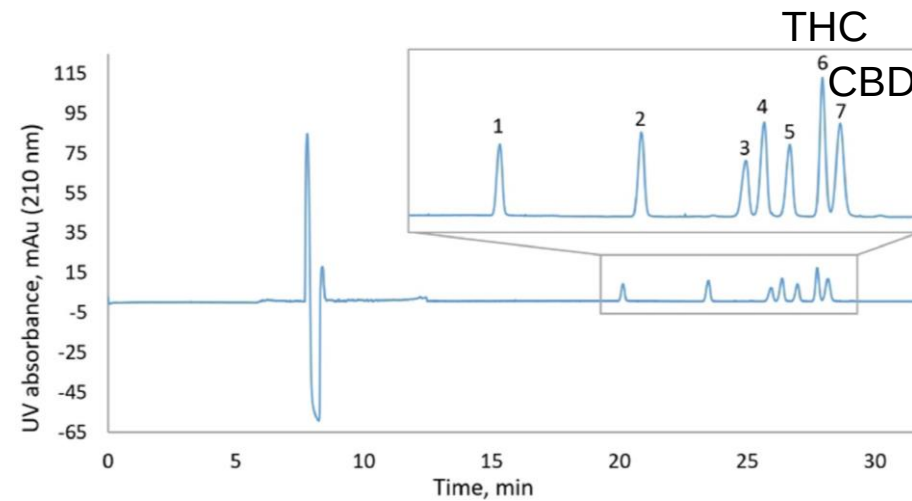
Cannabinoid decarboxylation



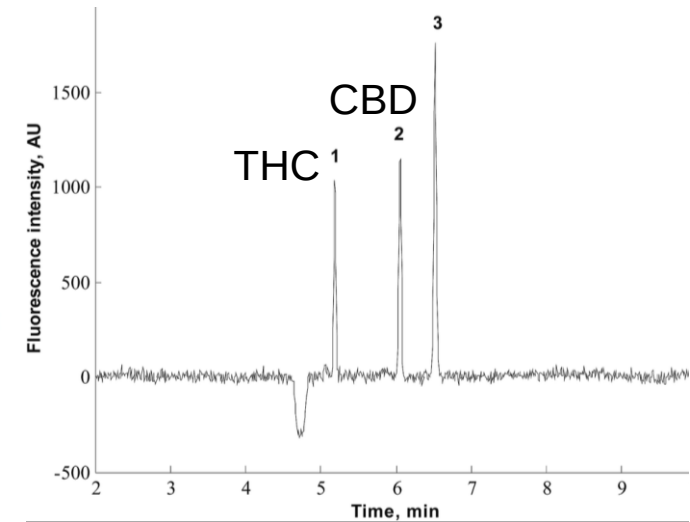
Publications on cannabinoid separations using CE



Backofen et Al., 2002



Laanet et Al., 2012



Mazina et Al., 2015



Article

Single-Run Separation and Quantification of 14 Cannabinoids Using Capillary Electrophoresis

Emil A. Zaripov ^{1,2}, Tiah Lee ¹, Yuchu Dou ², Cory S. Harris ¹, Artem Egorov ³ and Maxim V. Berezovski ^{2,*} 

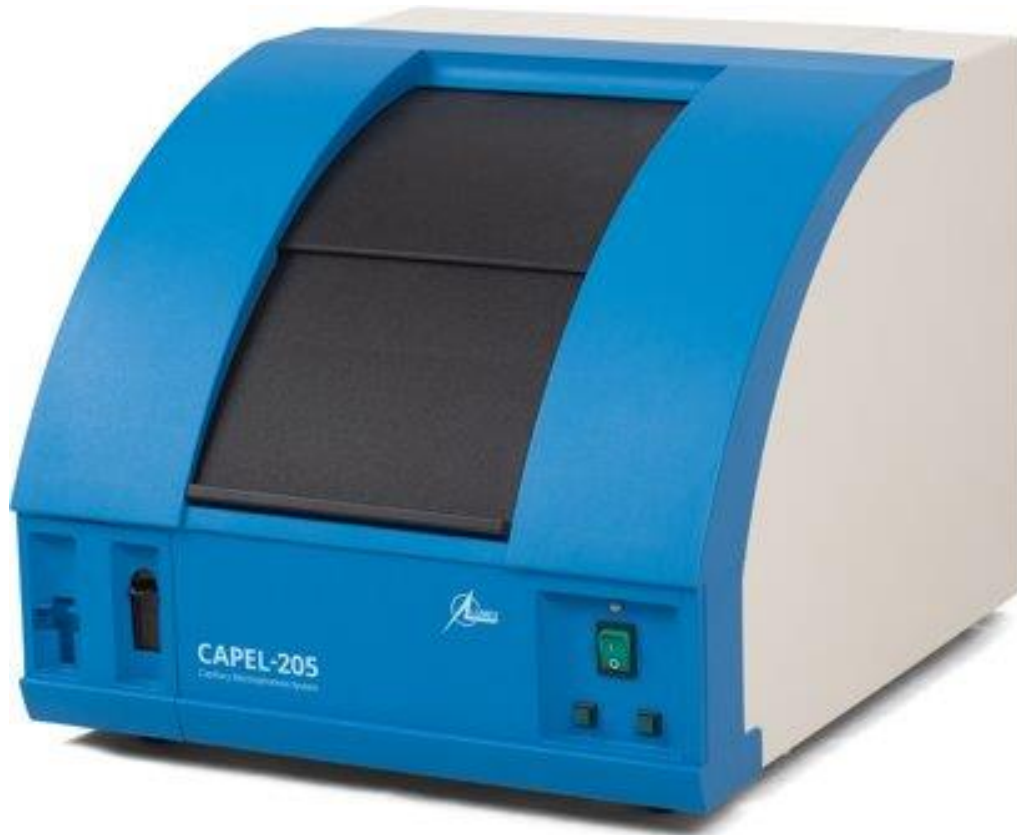
¹ Department of Biology, University of Ottawa, Ottawa, ON K1N 6N5, Canada; ezari068@uottawa.ca (E.A.Z.); tlee076@uottawa.ca (T.L.); charris@uottawa.ca (C.S.H.)

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³ Lumex Instruments Canada, Mission, BC V4S 0A3, Canada; eaa@lumexinstruments.com

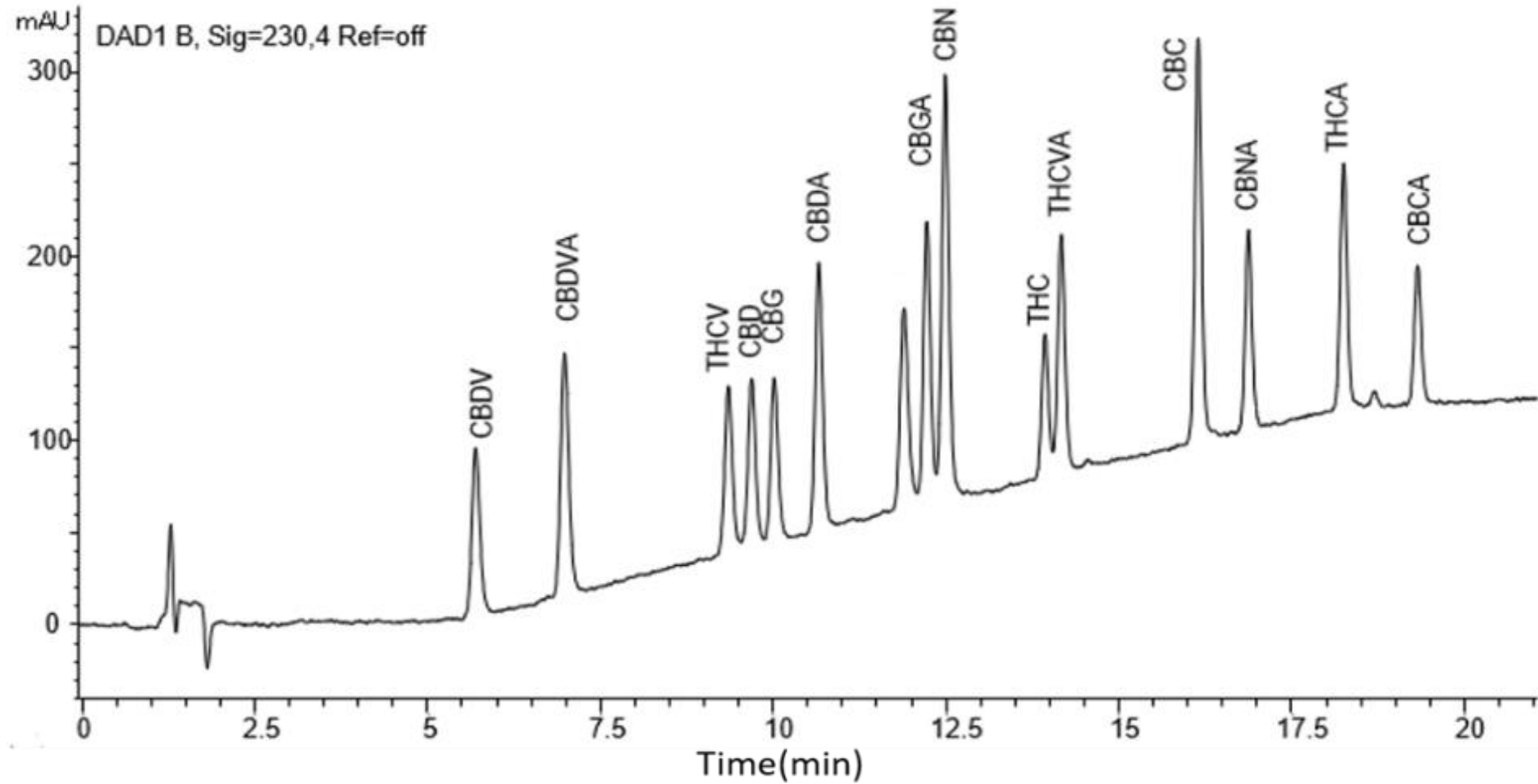
* Correspondence: maxim.berezovski@uottawa.ca

CE system and method

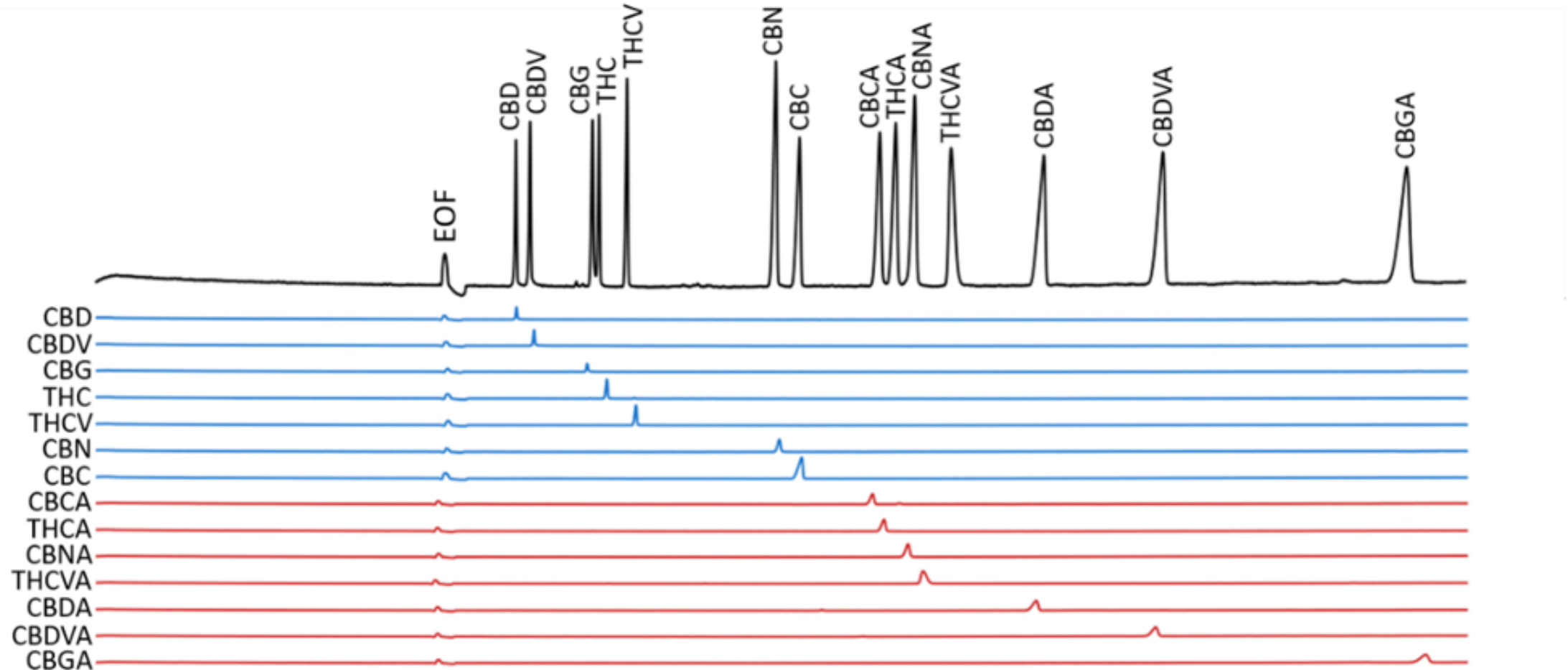


- 6.5 mM NaOH and 25 μ M β -cyclodextrin in 60/40 acetonitrile/water
- 10 mbar sample injection for 3 seconds
- 450 V/cm electric field was applied
- Detection with 230nm UV absorbance

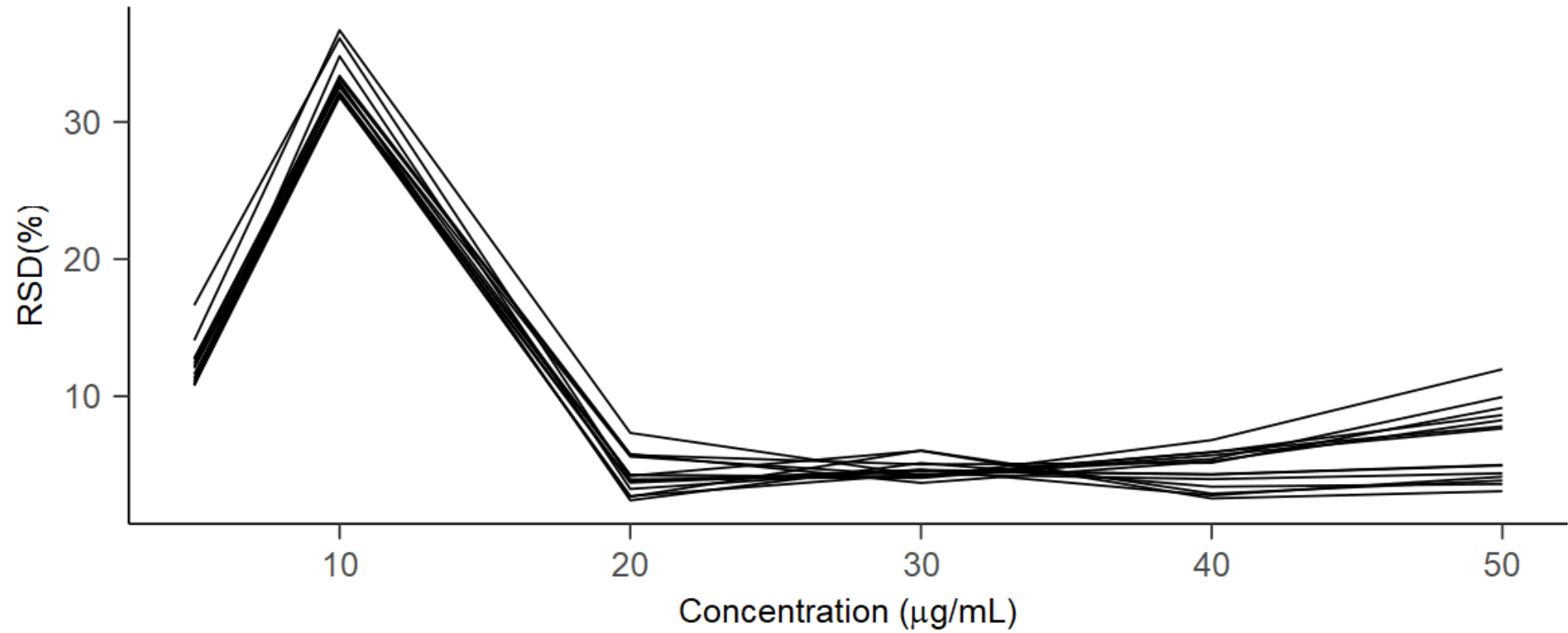
HPLC separation



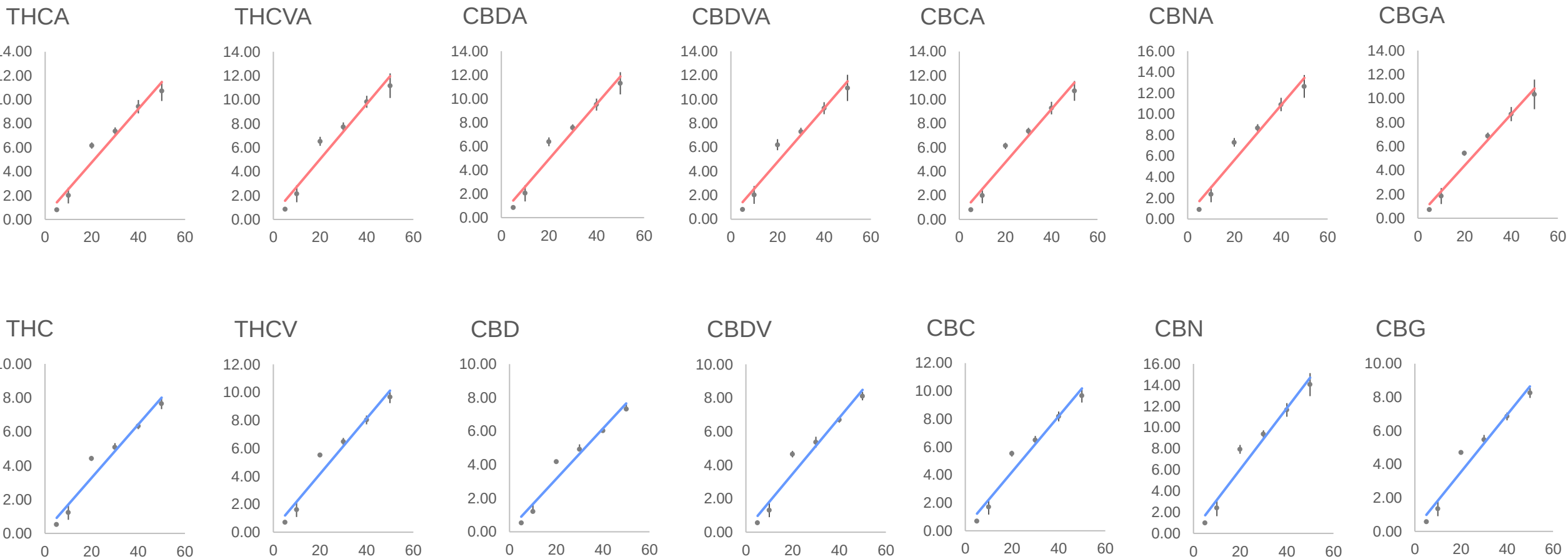
Separation of 14 cannabinoids



Linear range and RSD



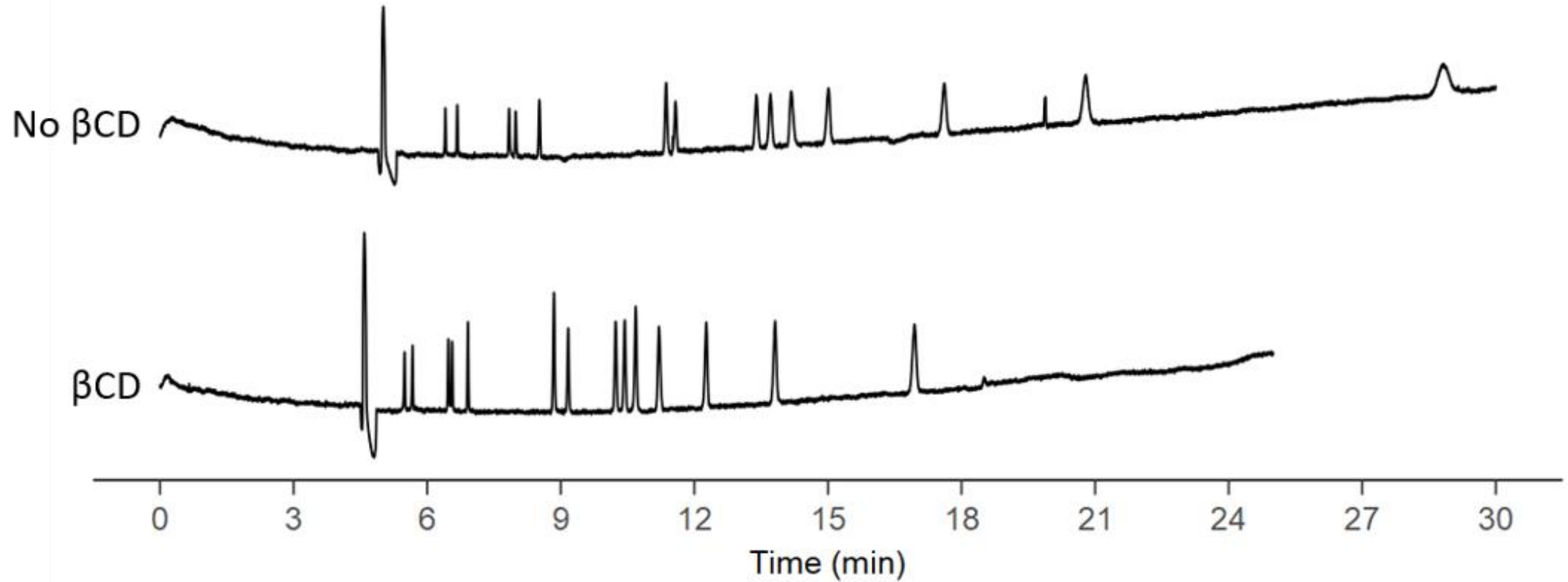
Calibration curves



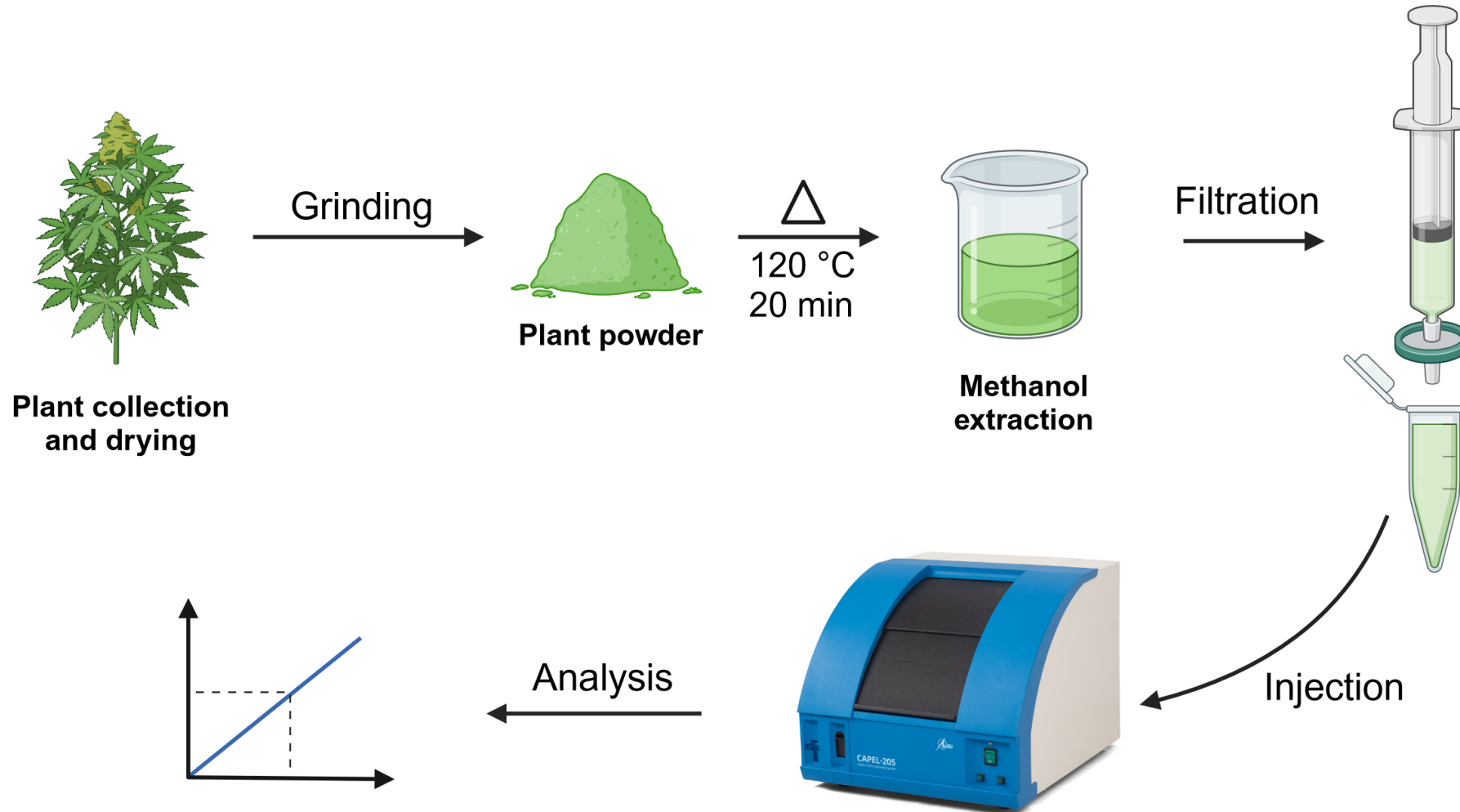
Limits of detection and quantification

Compound Name	LOD (µg/mL)	LOQ (µg/mL)
CBD	1.3	3.8
CBDV	1.2	3.7
CBG	1.5	4.6
THC	1.2	3.7
THCV	1.3	4.0
CBN	1.4	4.1
CBC	1.2	3.7
CBCA	1.4	4.3
THCA	1.3	3.8
CBNA	1.4	4.3
THCVA	1.6	4.8
CBDA	1.4	4.1
CBDVA	1.8	5.4
CBGA	1.7	5.0

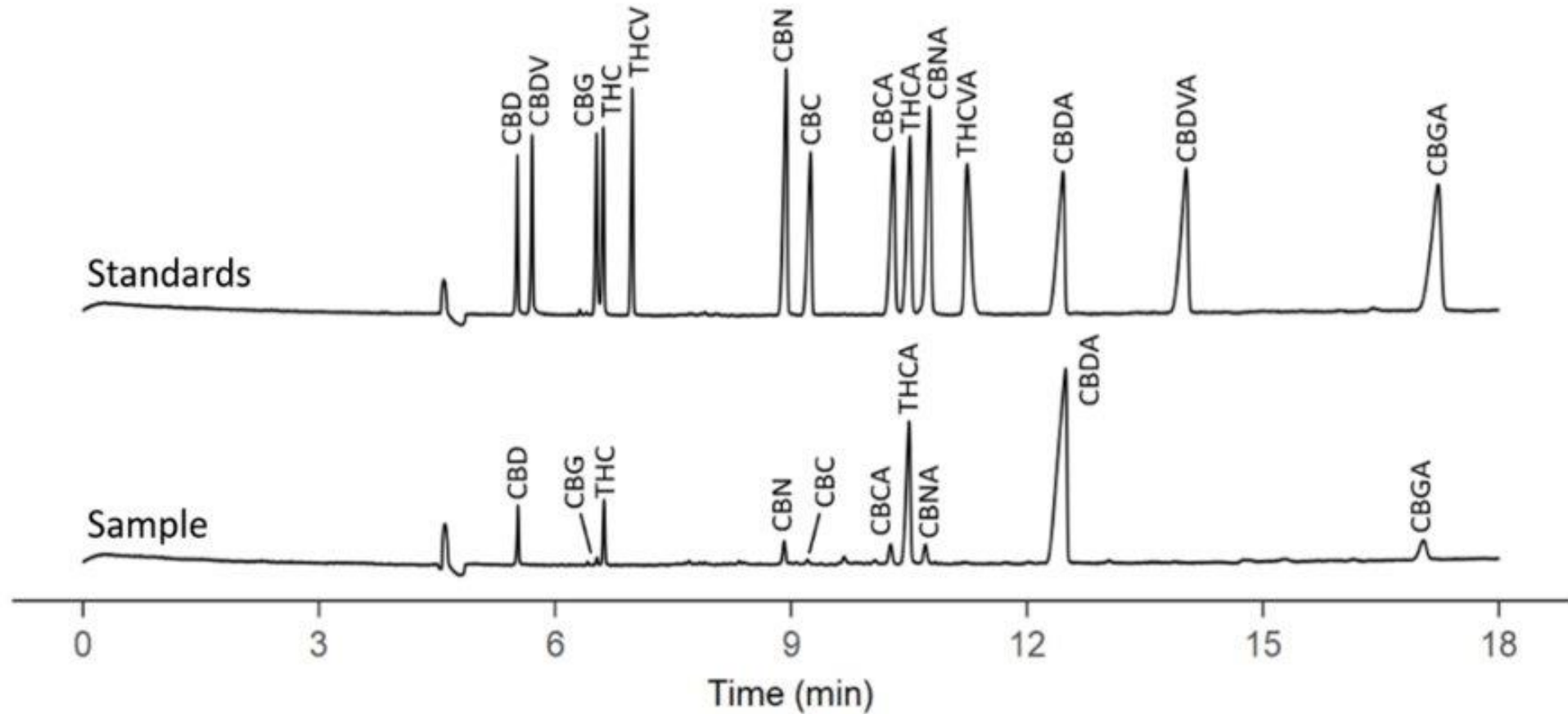
Effects of B-cyclodextrin



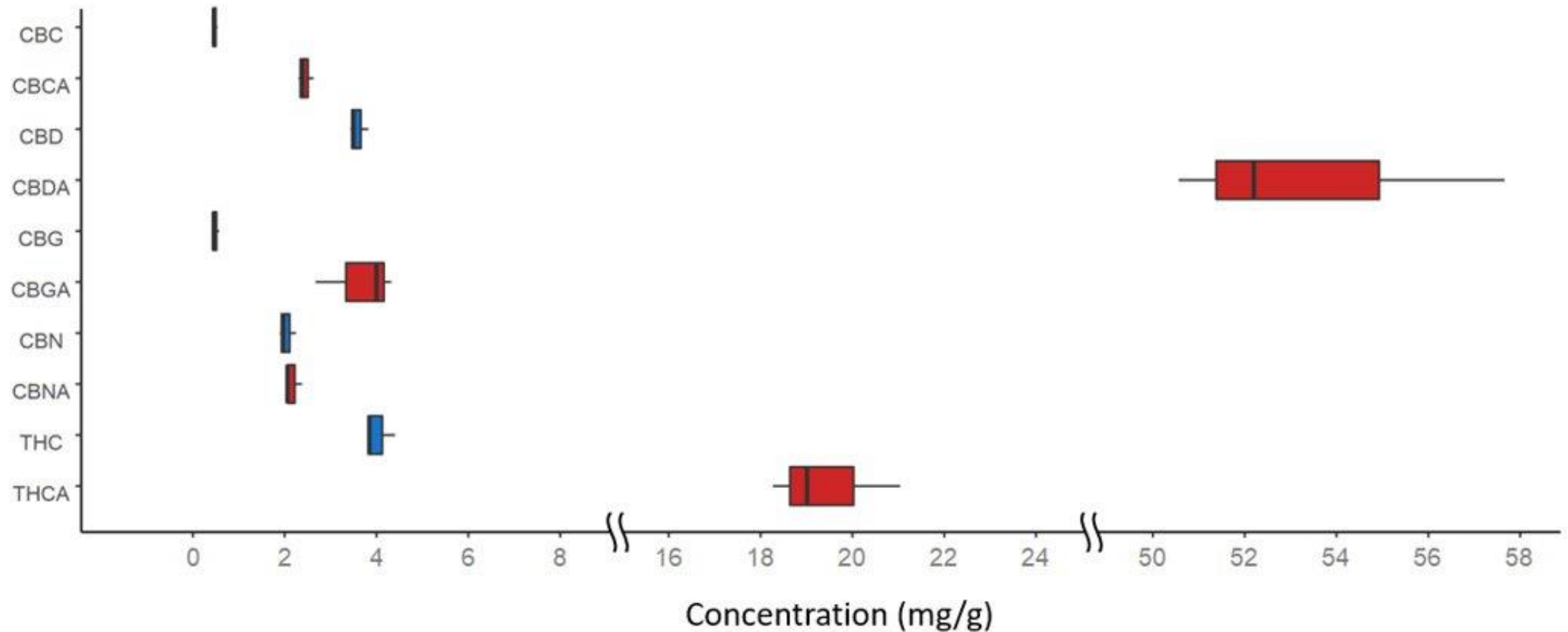
Sample preparation



Detection in sample

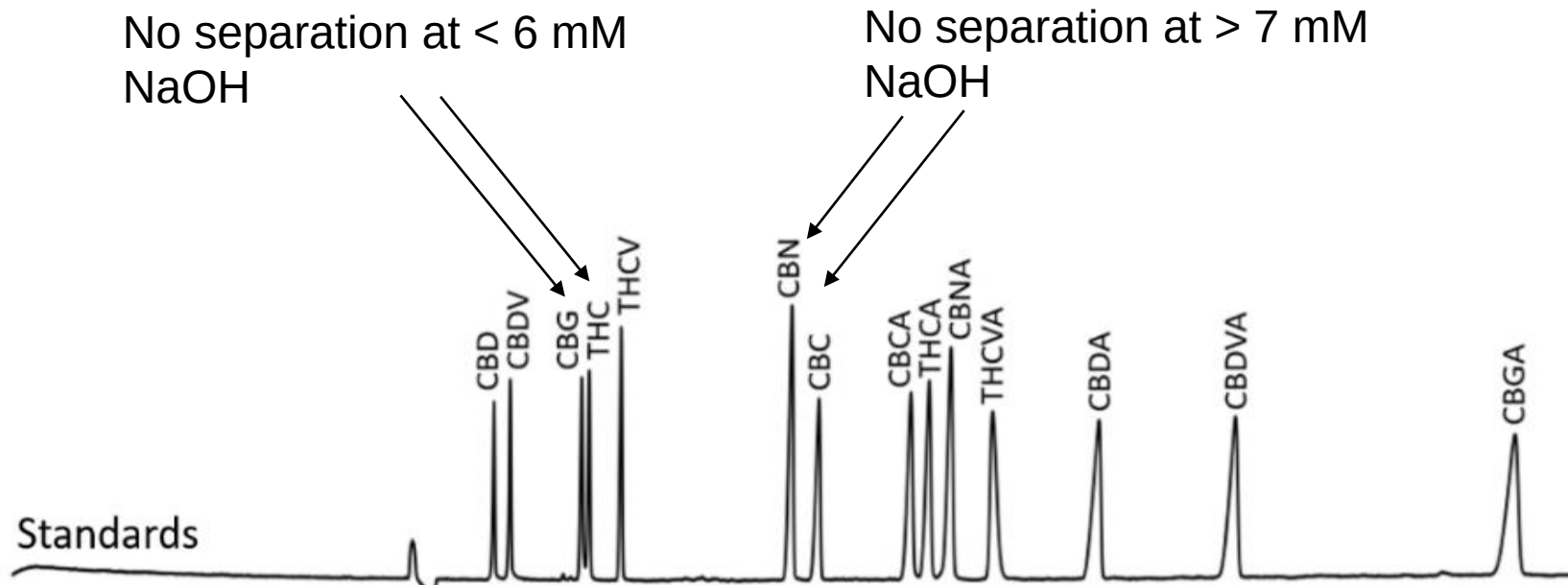


Cannabinoid presence in plant



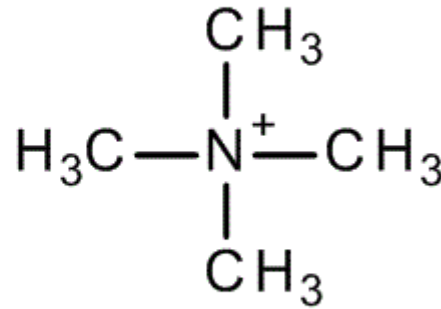
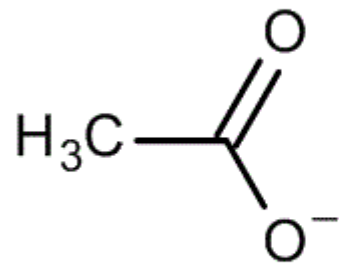
Drawbacks

- BGE is not buffered and can fluctuate
- BGE tends to evaporate and decrease separation
- Sodium hydroxide concentration must be precise



Future directions

- Potentially use a different electrolyte providing same pH but buffering capability



Tetraethylammonium acetate

- Investigate different cannabinoids for potential migration overlap

Acknowledgements



Berezovski Lab group:

- Maxim V. Berezovski – PI
- Yuchu Dou

Harris Lab group:

- Cory Harris – PI
- Tiah Lee

Lumex instruments

- Artem Egorov



Questions?

Presentation by:

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Doctorate Student

University of Ottawa

