



Why?

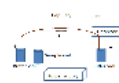
- Transfer
- Purify
- Stabilize



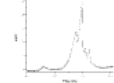
How?

- GC/MS
- HPLC
- CE

Capillary Electrophoresis



20 mM Tris buffer at pH 8



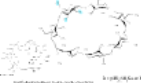
Cyclodextrin

Cyclic oligosaccharides

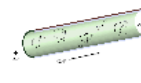
Structure	Number of Glucose Units	Approx. Diameter (Å)
	6	5.0
	7	6.5
	8	8.0

Hydrophobic inner cavity
Hydrophilic outer surface

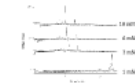
Derivatized CDs



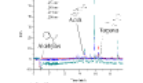
Cyclodextrin in a capillary



20 mM Tris buffer at pH 8, 10 mM SDS



Separation of the three chemical groups



Conclusions

- Cyclodextrin based HPLC separation is possible
- Hydrophobic oligomers
- Hydrophobic oligomers
- Hydrophobic oligomers

Acknowledgements

DCU
 DCU Enterprise Development Scheme (EDS)
 Dublin City University and DCU
 Prof. John Hayes
 My 360 Degree
 DCU

Determination of nine resin acids in natural gum rosins by cyclodextrin-modified capillary electrophoresis

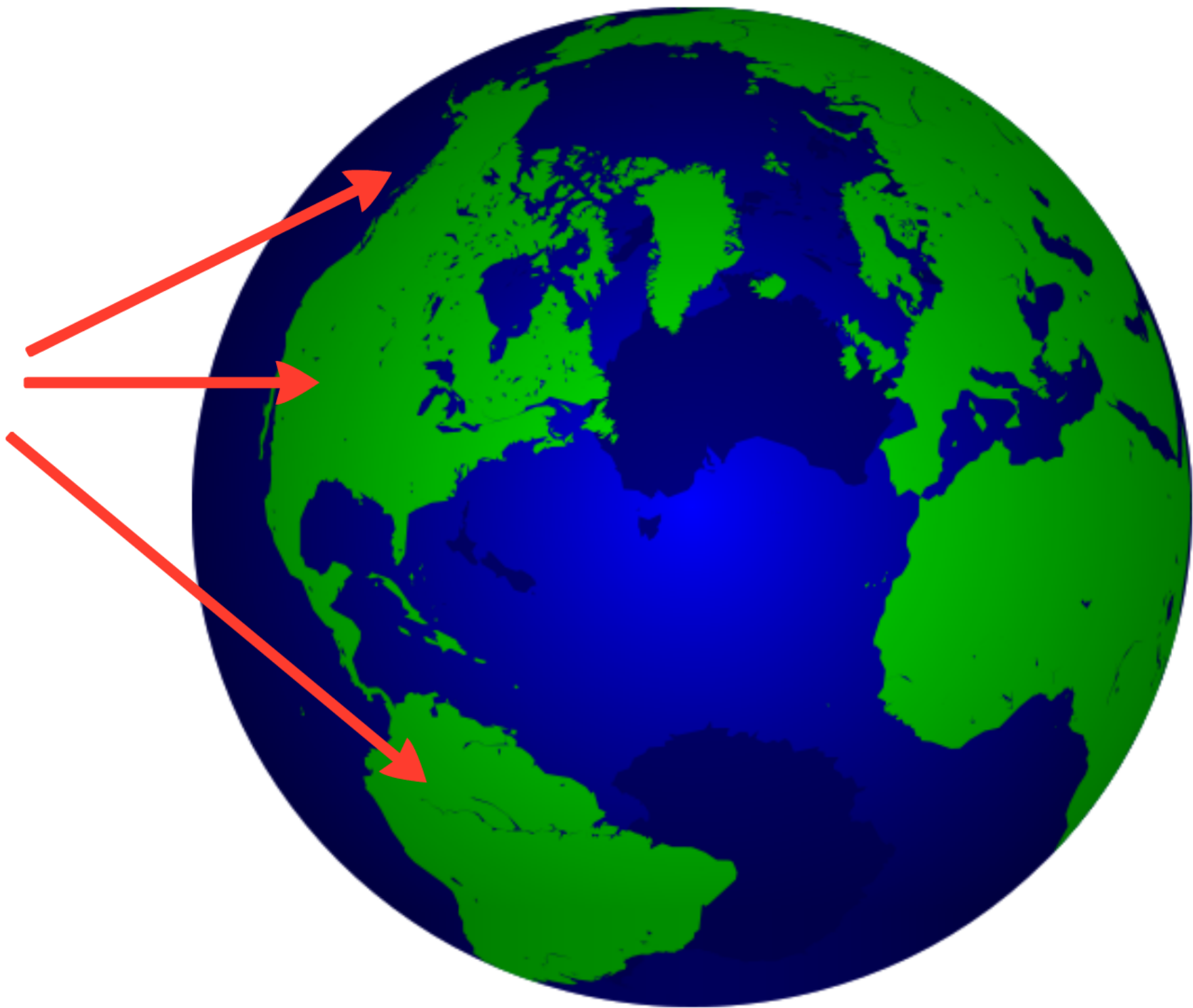
Louise Mckeen, Fiona Regan
IRCSET Enterprise Partnership Scheme
Dublin City University
Henkel





What?





Why?

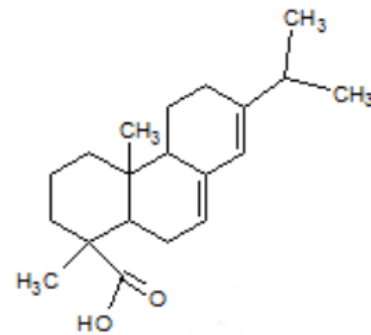
- Varnishes
- Paints
- Solder flux



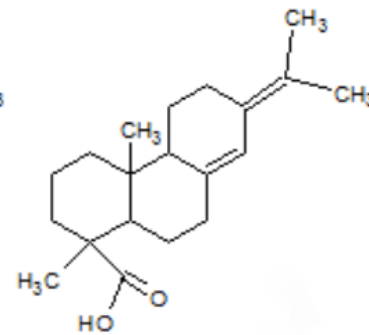
How?

- GC-MS
- HPLC
- CE

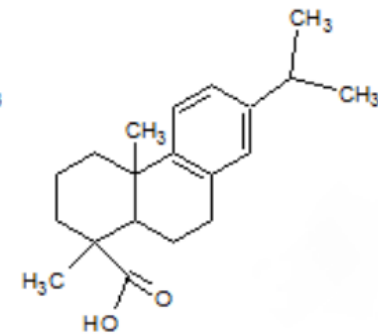
Abietic type acids



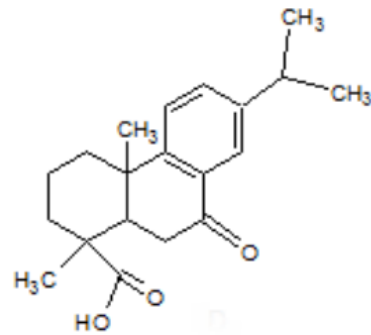
Abietic acid (ABA)



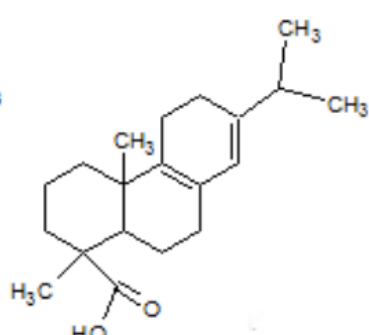
Neoabietic acid (NEO)



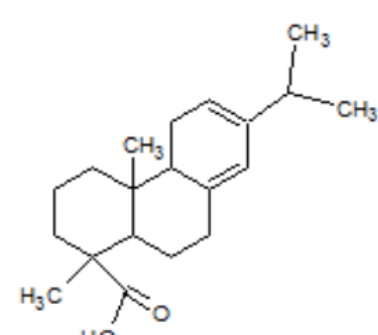
Dehydroabietic acid (DHA)



7-Oxodehydroabietic acid (7OXO)

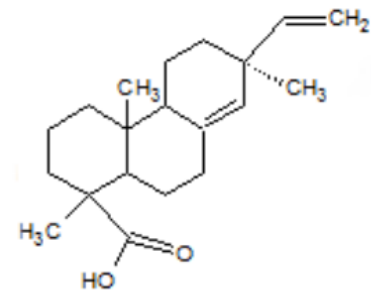


Palustric acid (PAL)

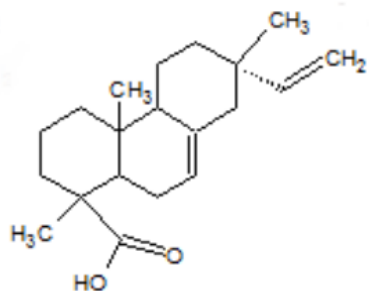


Levopimaric acid (LVO)

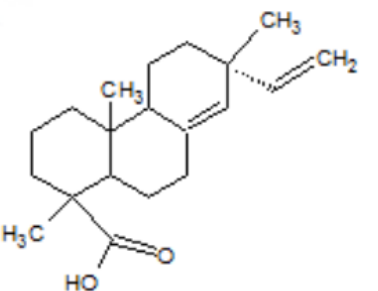
Pimaric type acids



Pimaric acid (PIM)

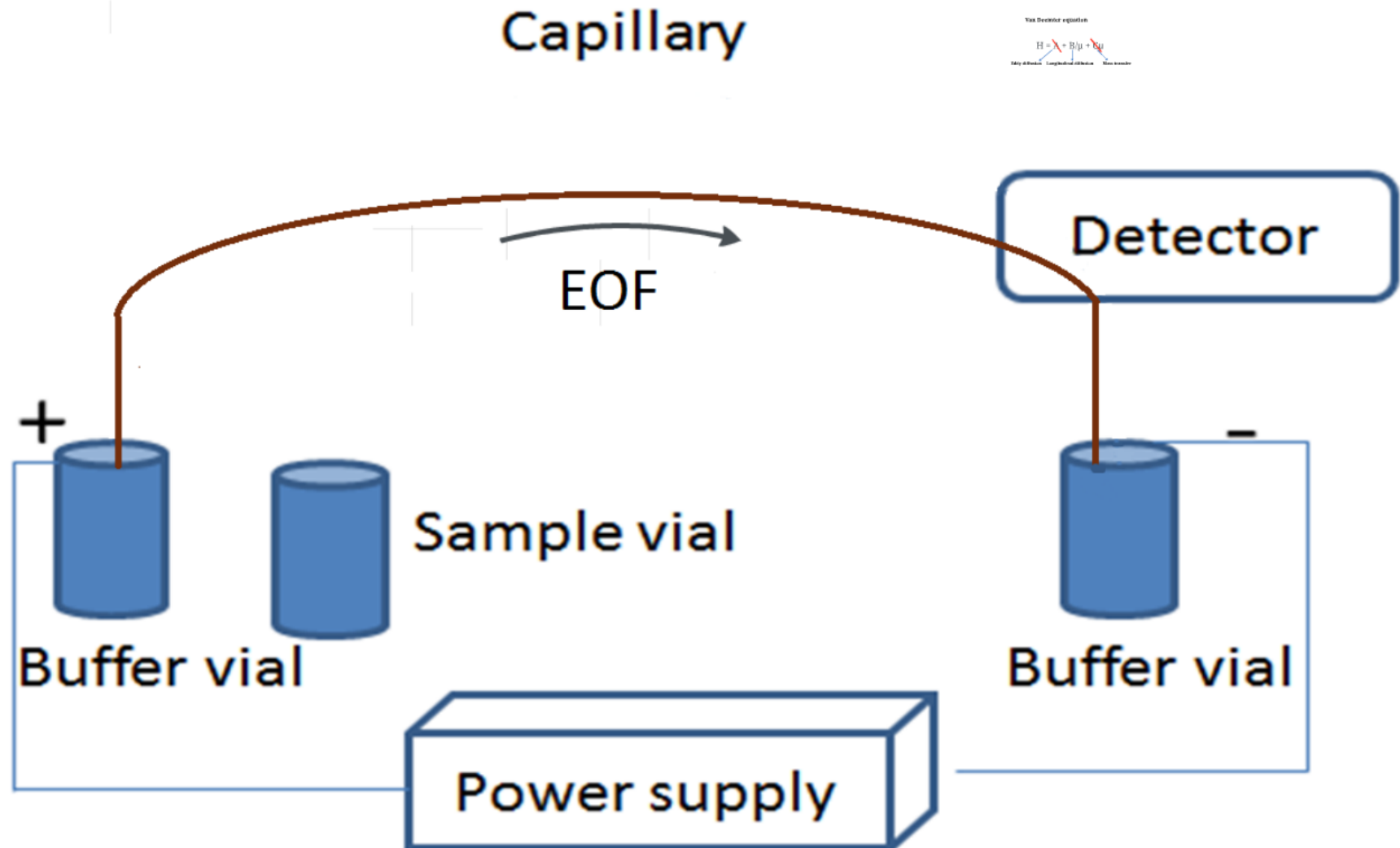


Isopimaric acid (ISO)



Sandaracopimaric acid (SAN)

Capillary Electrophoresis



Van Deemter equation

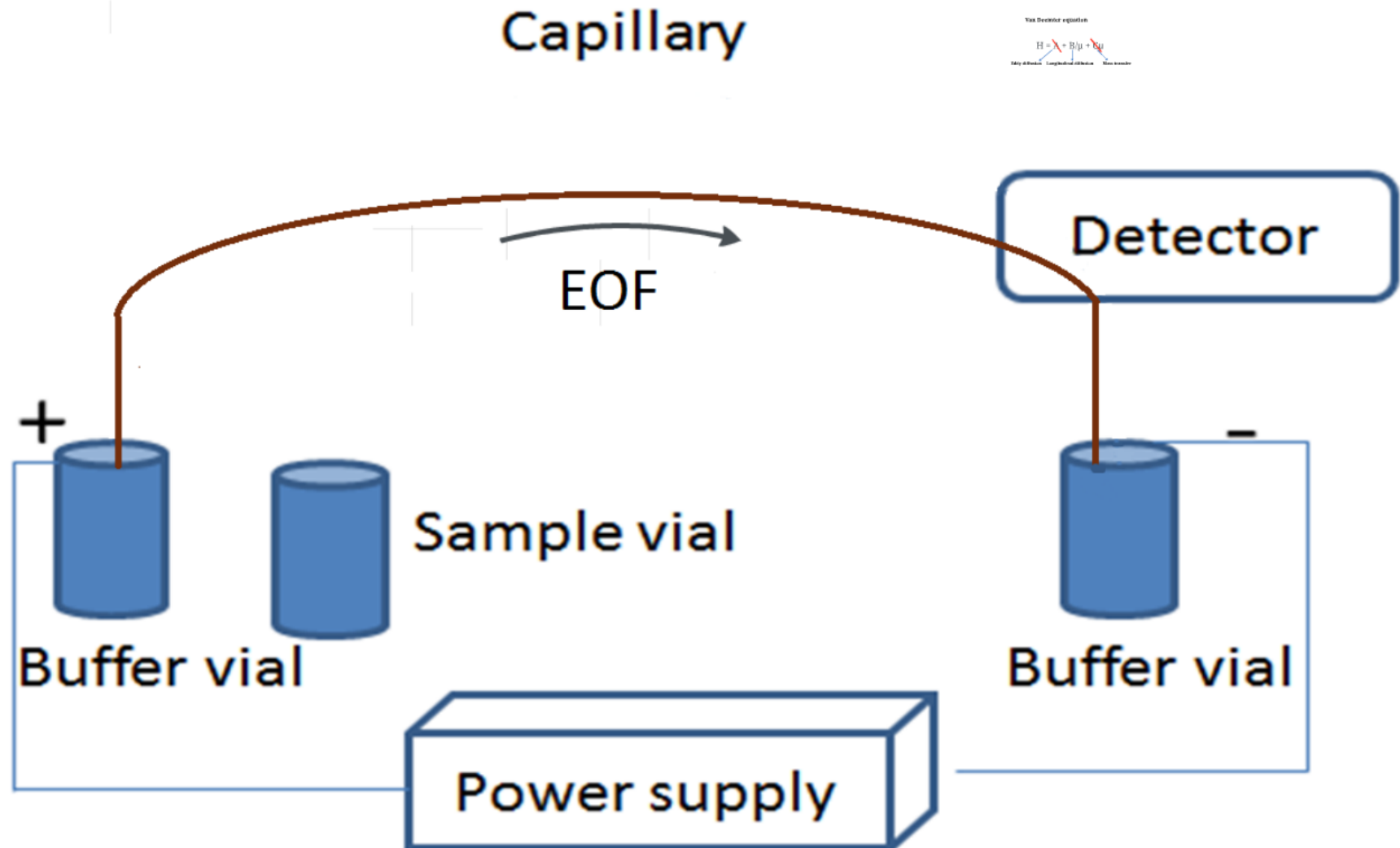
$$H = \cancel{A} + B/\mu + \cancel{Cu}$$

Eddy diffusion

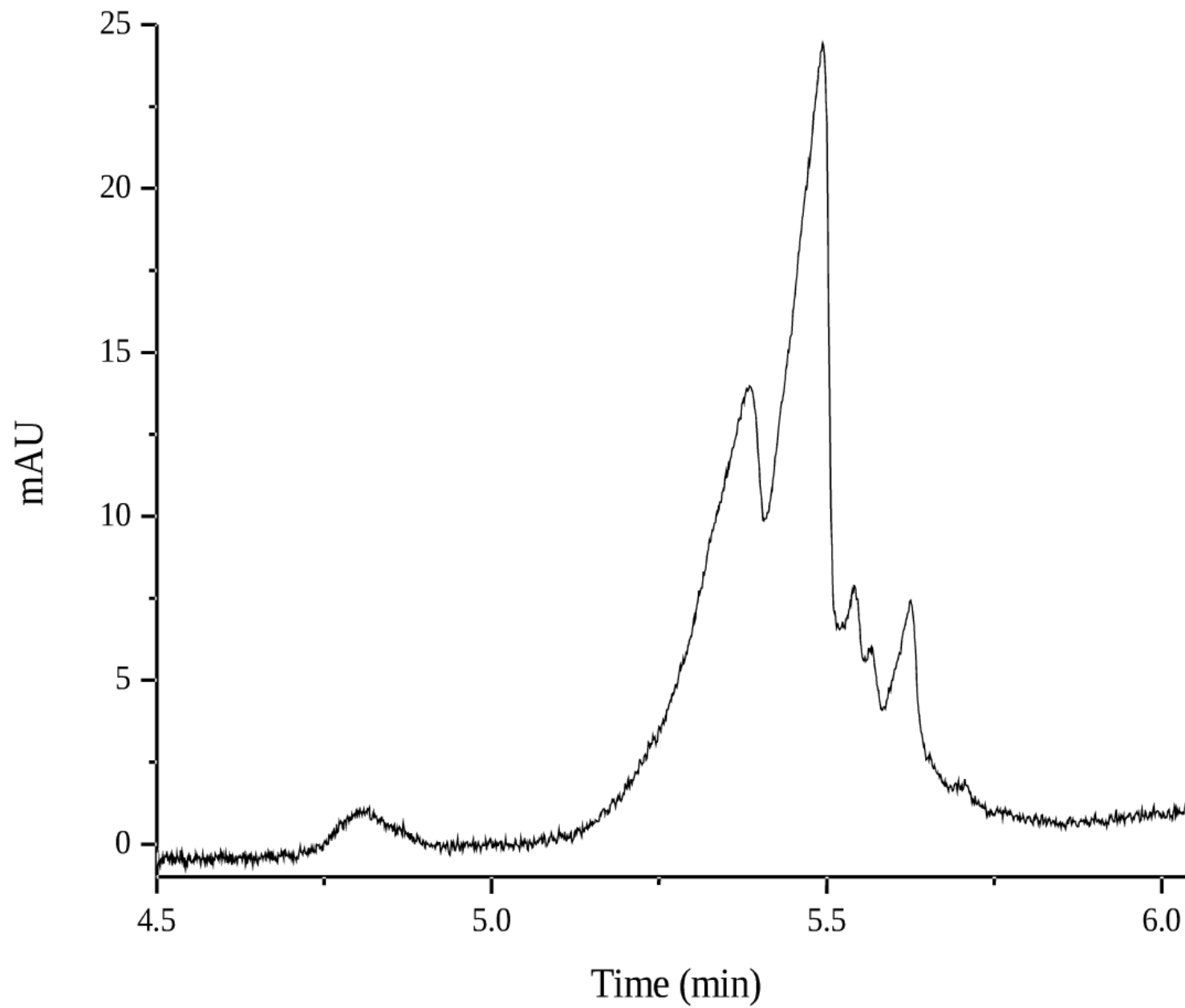
Longitudinal diffusion

Mass transfer

Capillary Electrophoresis

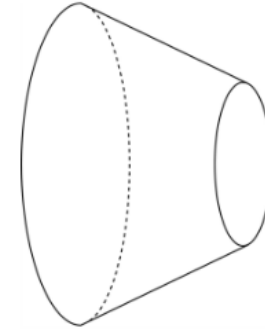


20 mM Tris buffer at pH 8



Cyclodextrins

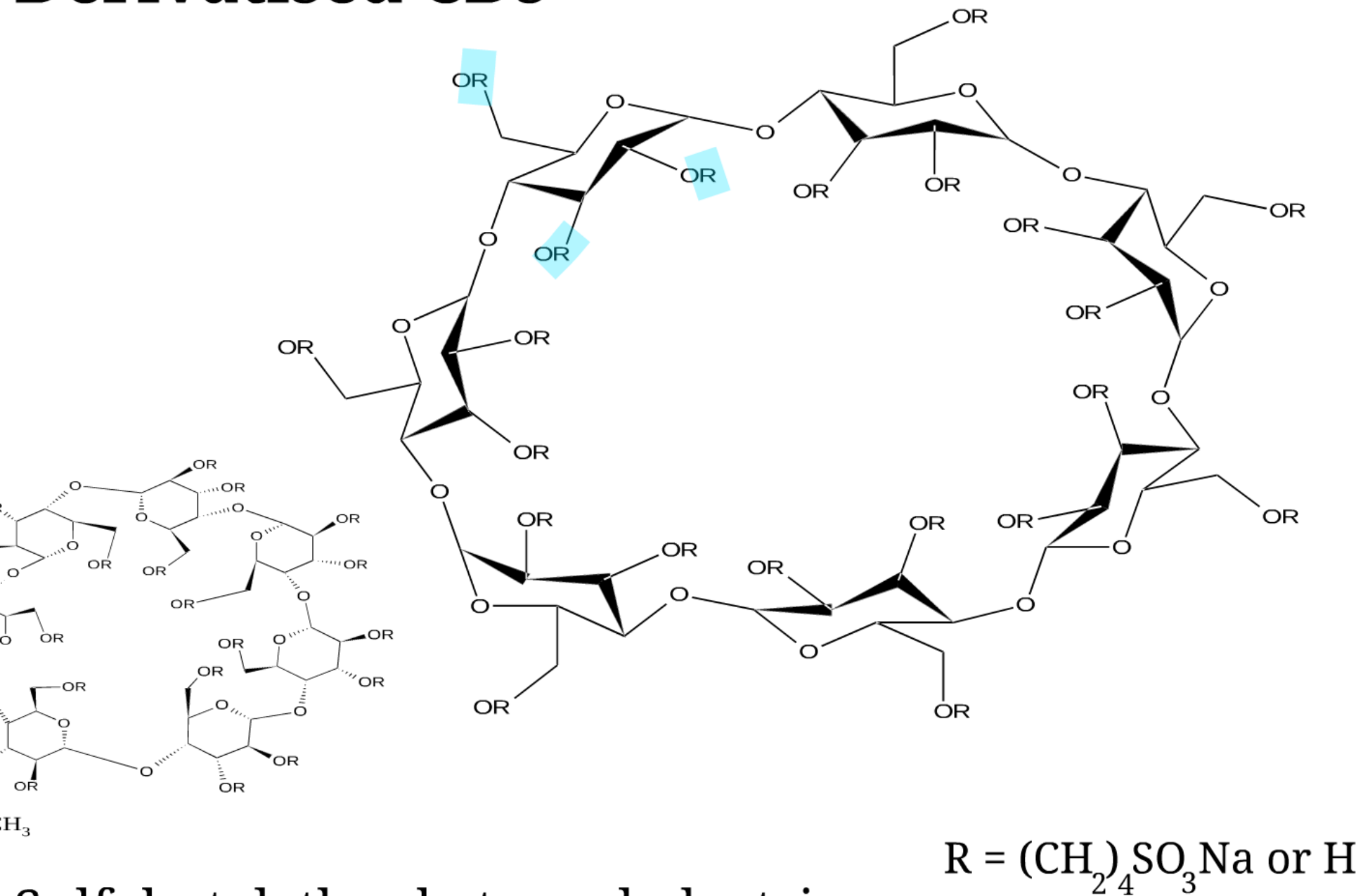
Cyclic oligosaccharides



	α	β	γ
Glucose units	6	7	8
Cavity width	0.47-0.53	0.6-0.65	0.75-0.83
Cavity depth (nm)	0.79	0.79	0.79

Hydrophobic inner cavity
Hydrophilic outer surface

Derivatised CDs

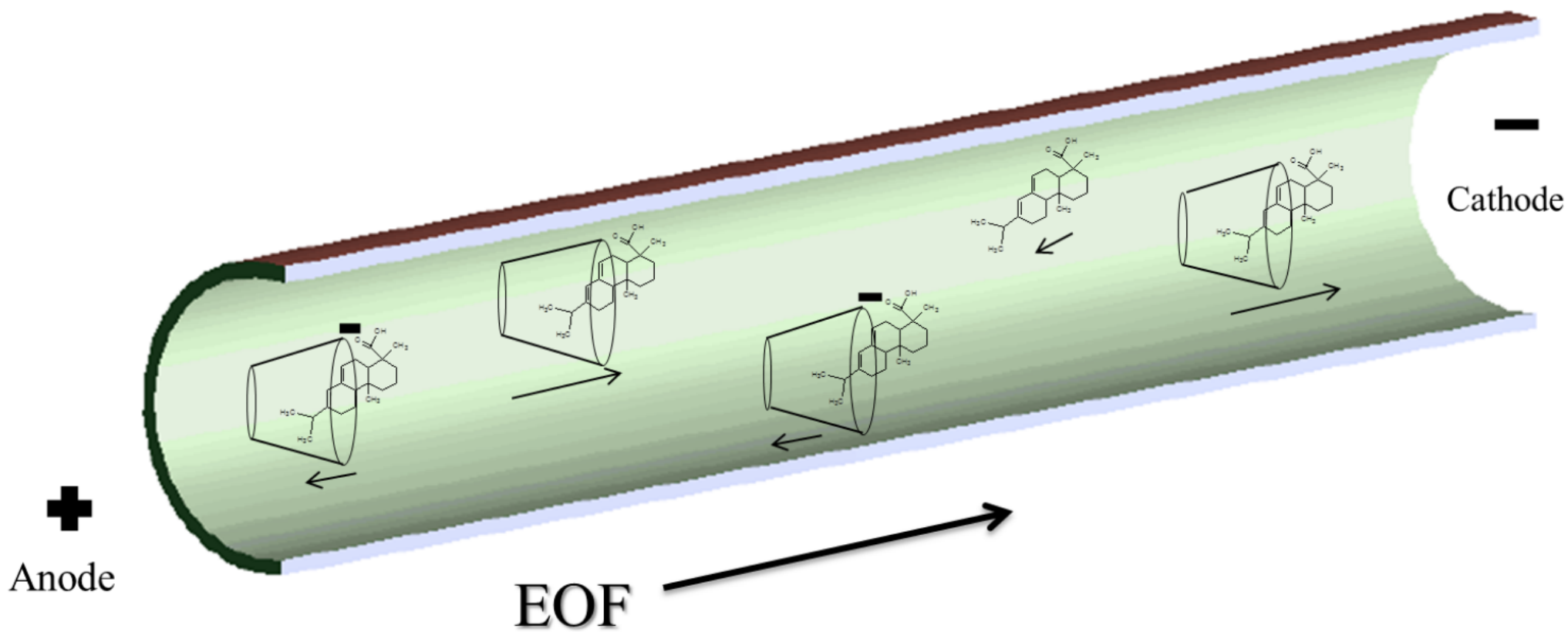


H₃

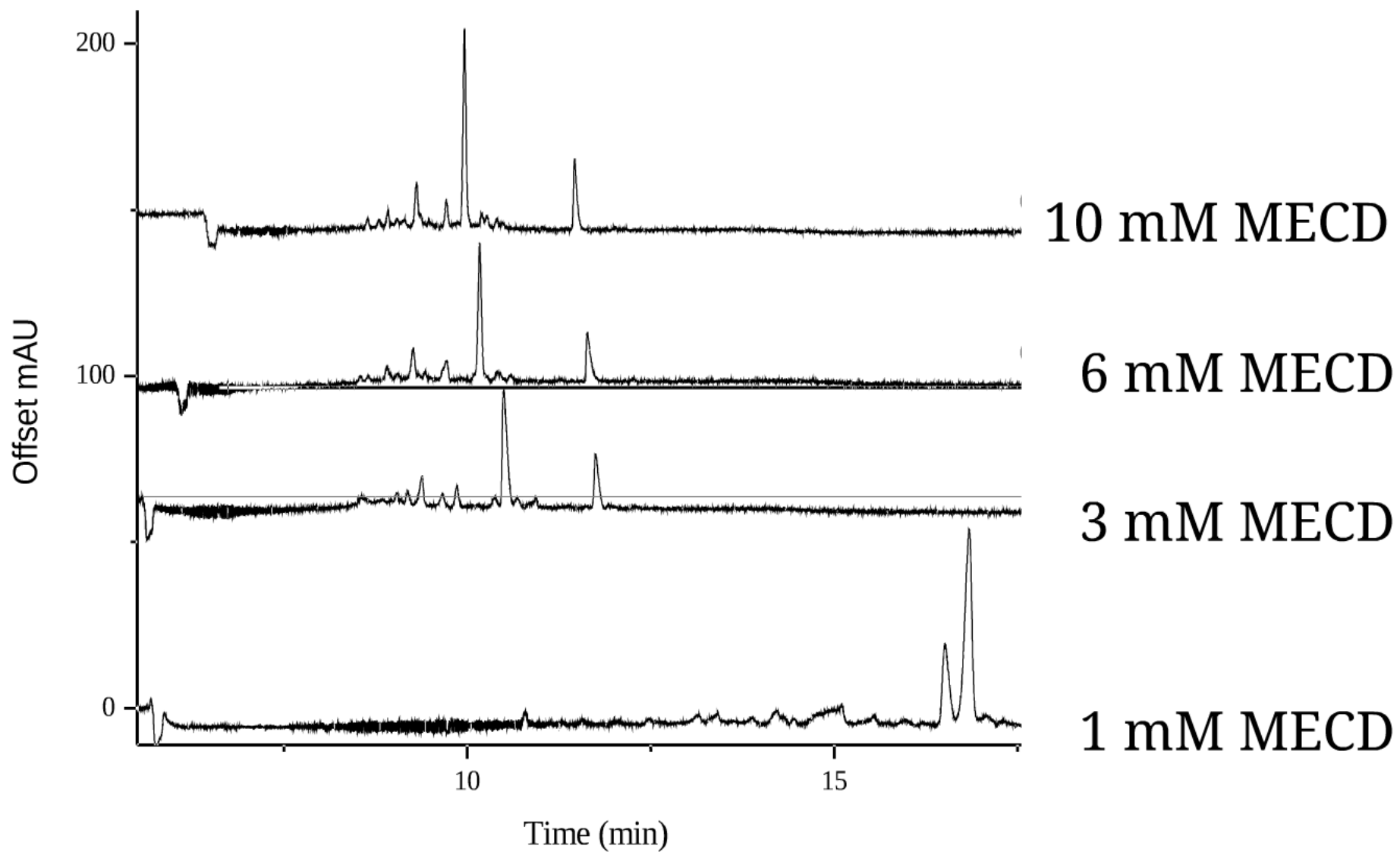
$R = (\text{CH}_2)_4\text{SO}_3\text{Na}$ or H

Sulfobutylether beta cyclodextrin

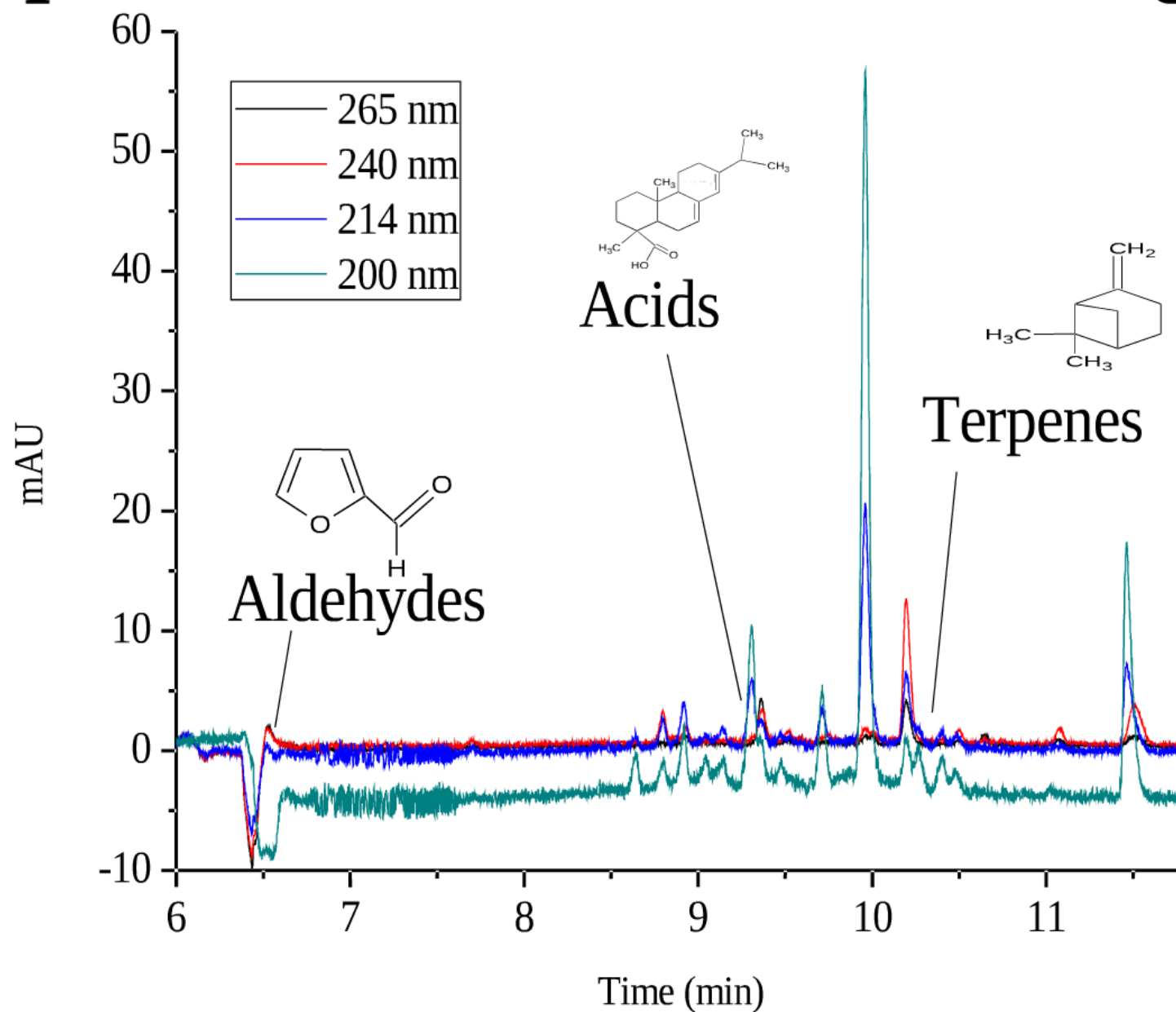
Cyclodextrins in a capillary



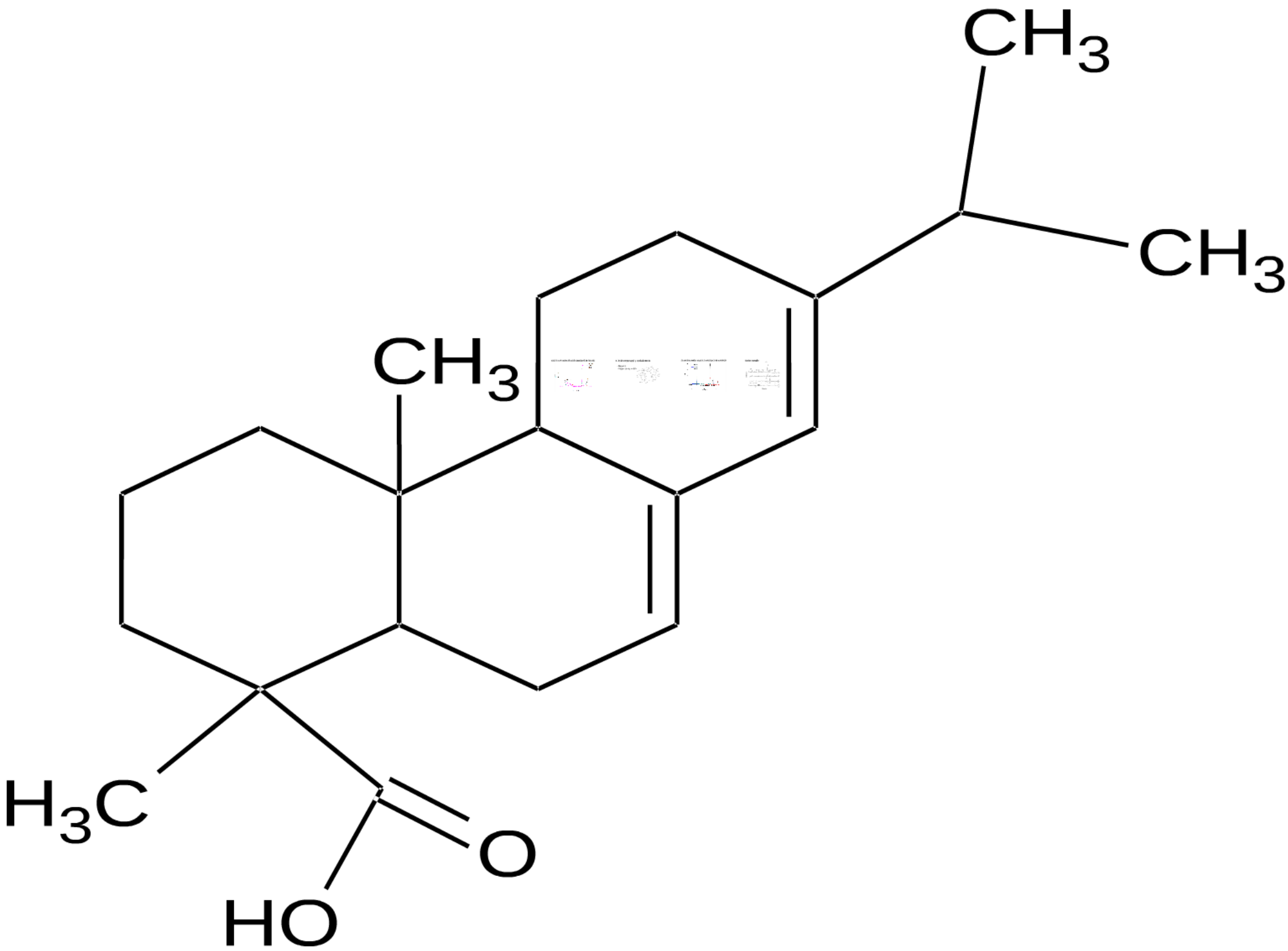
20 mM Tris buffer at pH 8, 10 mM SBCD



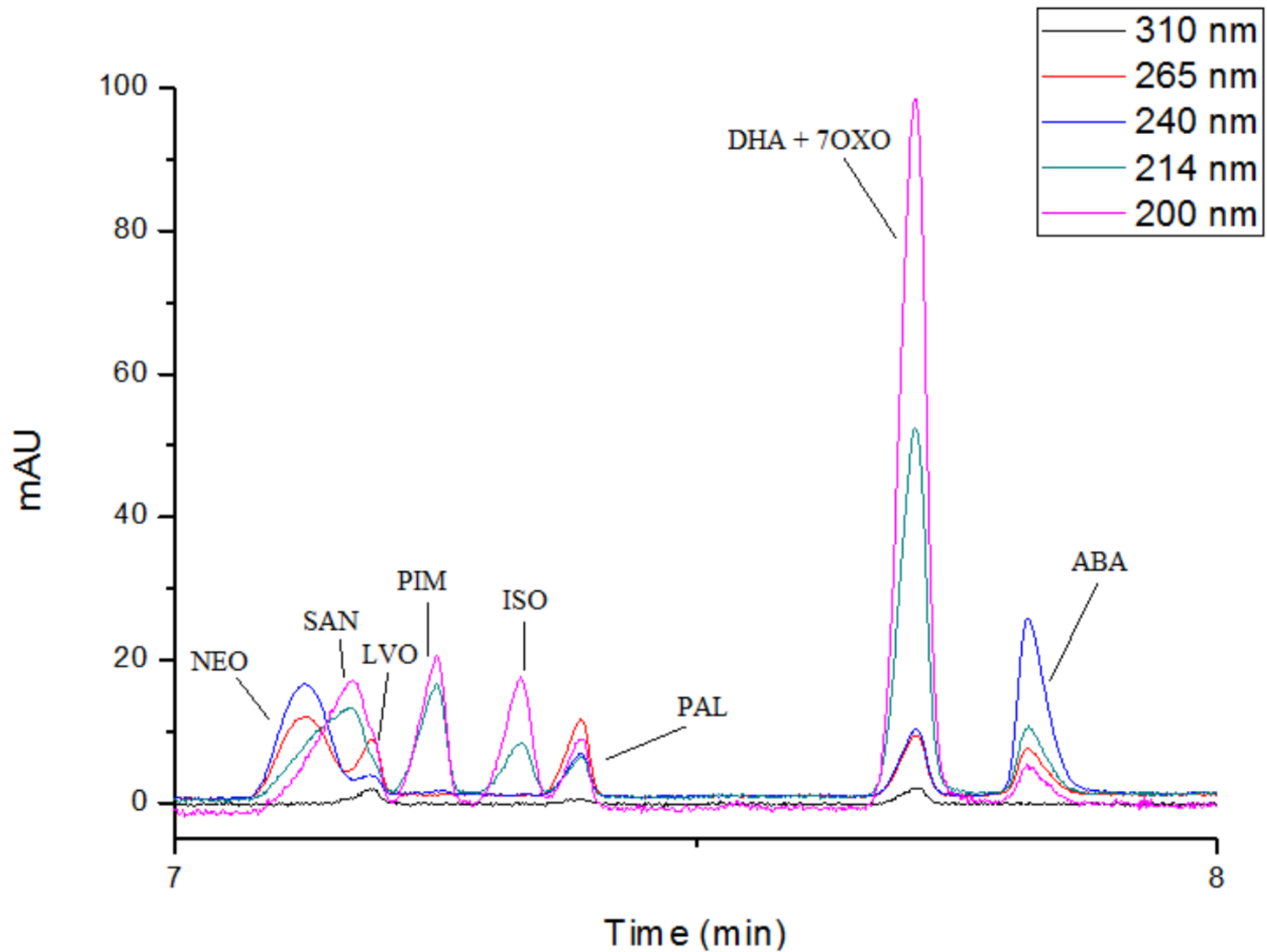
Separation of the three chemical groups



20 mM Tris buffer at pH 8, 10 mM MECD 10 mM SBCD

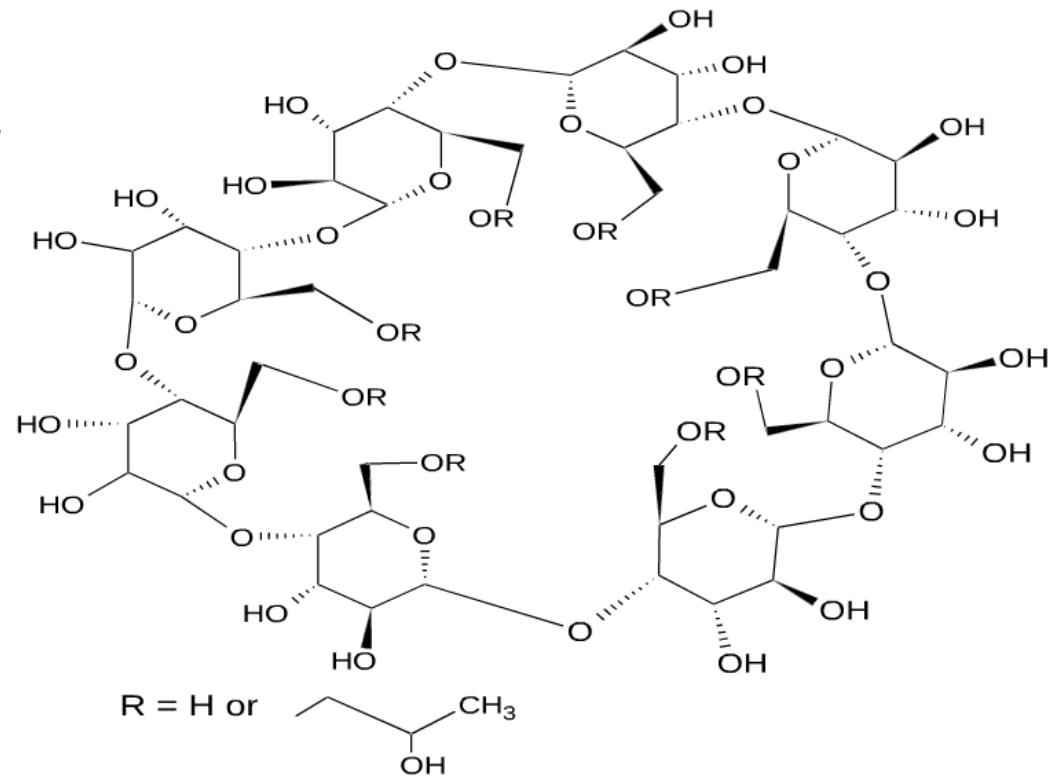


0.01% w/v mixed acid standard in MeOH

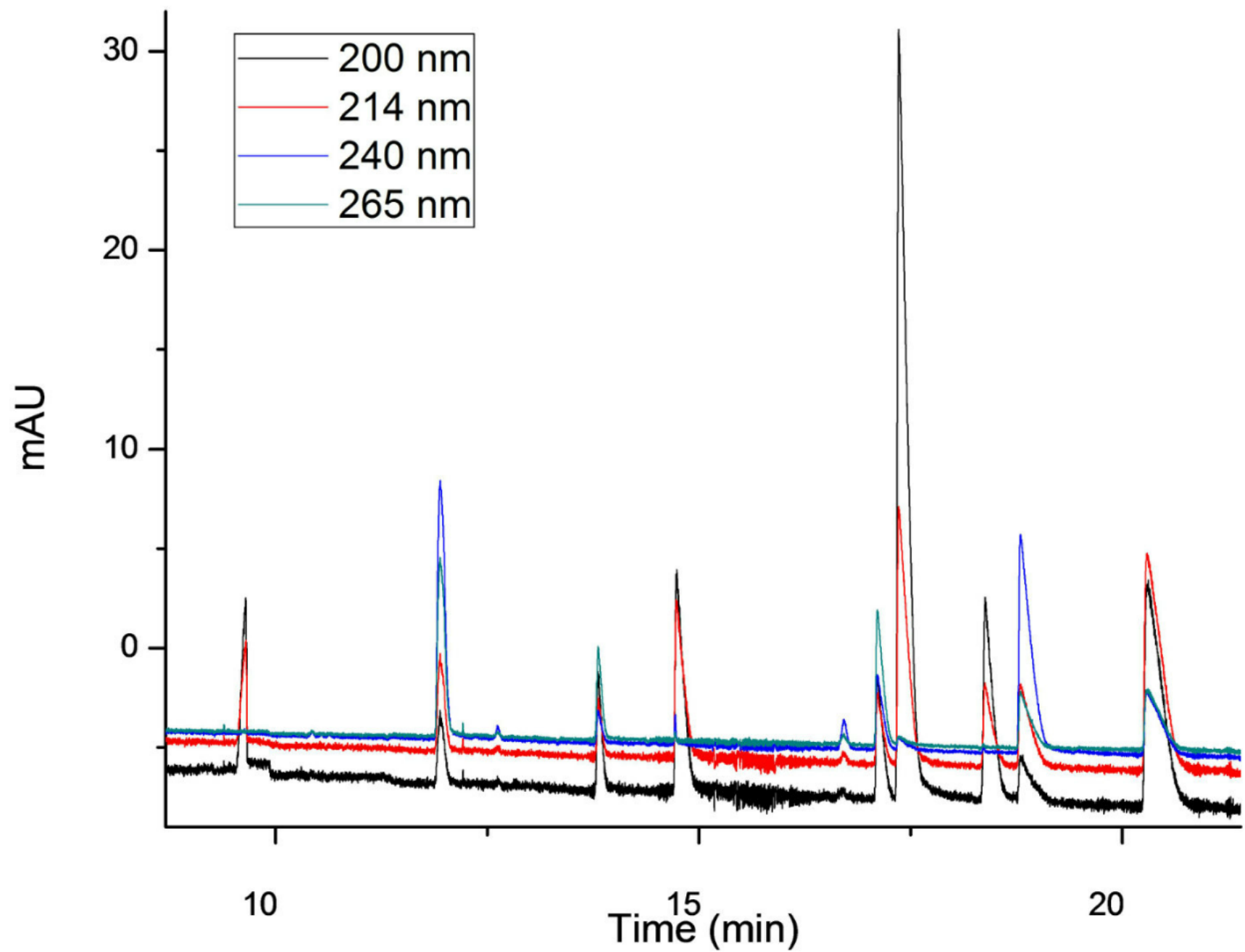


2-hydroxypropyl γ cyclodextrin

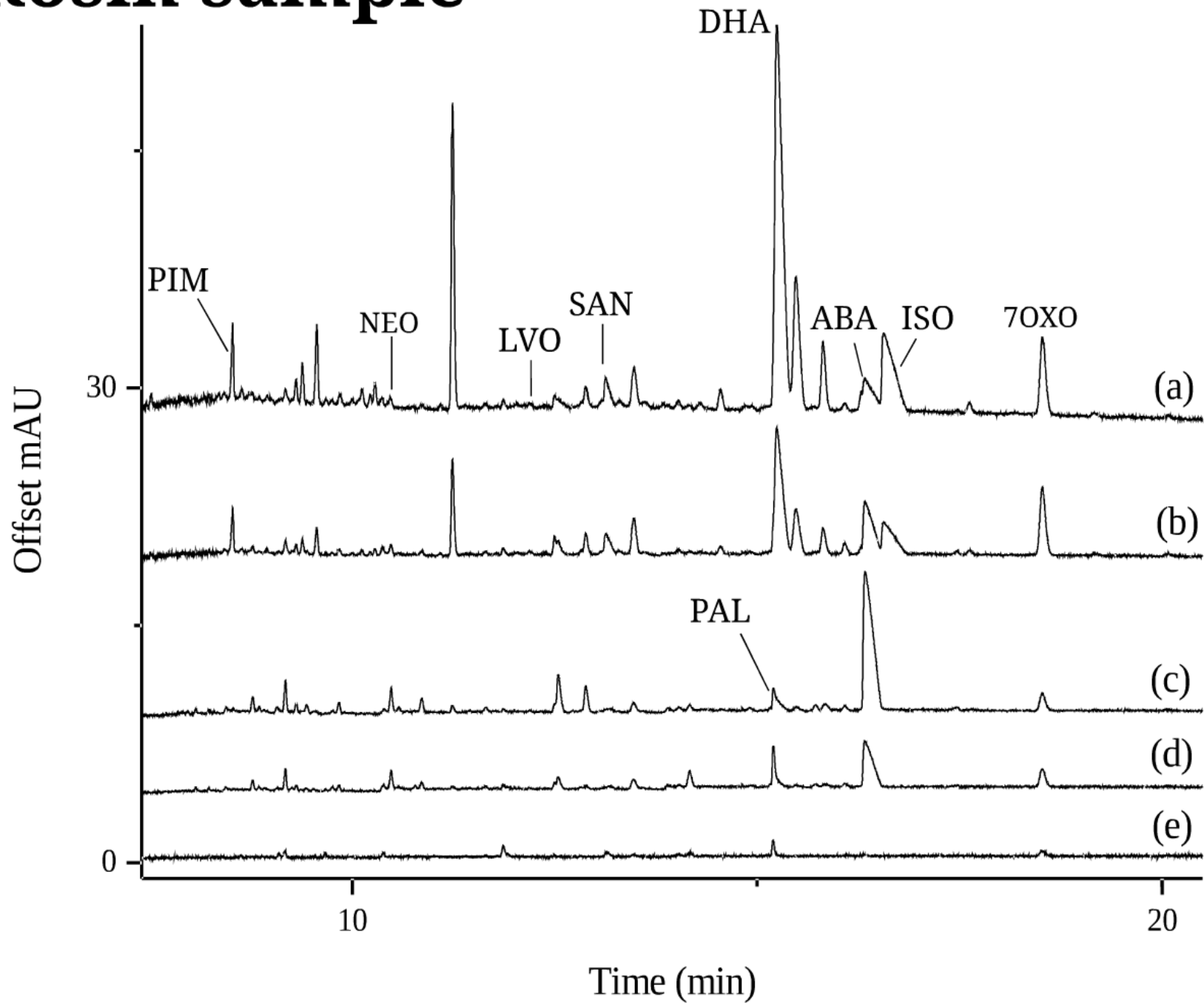
- Neutral
- Bigger cavity width



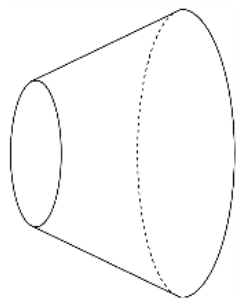
20 mM Tris buffer at pH 8, 5 mM HPyCD 10 mM SBCD



Rosin sample



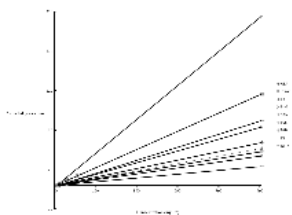
Conclusions



A cyclodextrin based CE method separated the three chemical groups in rosins

γ

Further developed to separate 9 resin acids



Spiked samples and calibration curves were used to identify and quantify the acids present in gum rosin samples

Acknowledgements



IRCSET Enterprise Partnership Scheme (IRC)
Dublin City University and Henkel

Prof. Fiona Regan

My lab colleagues

