



HPTLC Separation of Tryptamine-based Hallucinogens

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Matthew Wood, Ph.D., ABC-GKE², Jeanne Berk, Ph.D.¹, Thomas Brettell, Ph.D., ABC-GKE¹,

¹Forensic Science Program, Cedar Crest College

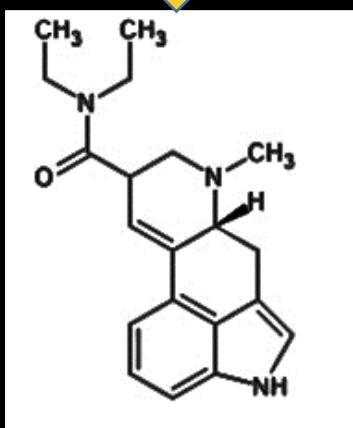
²Ocean County Sheriff's Department, Toms River, NJ 08753



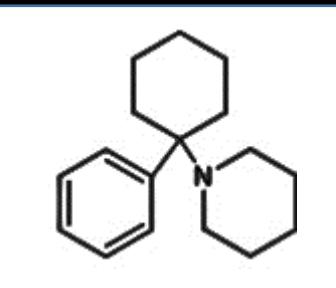
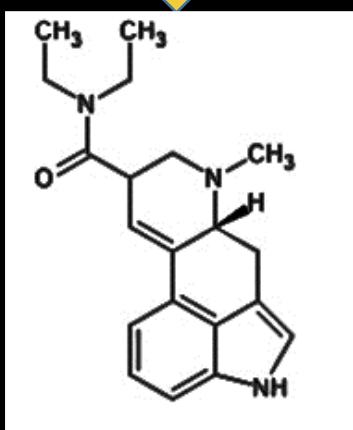
CEDAR CREST
COLLEGE

cedarcrest.edu

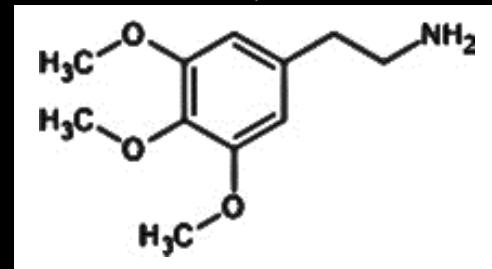
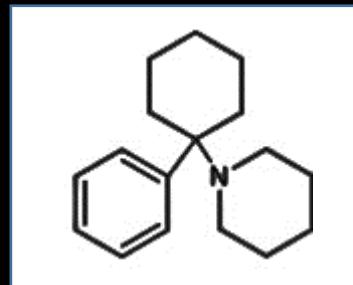
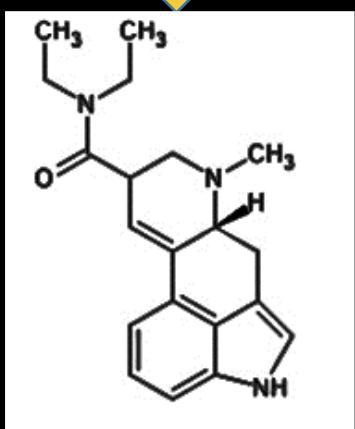
Hallucinogens



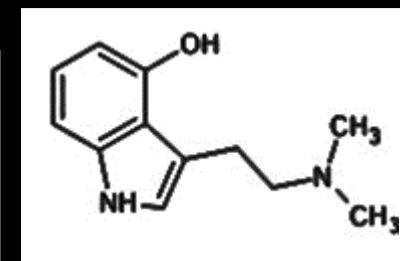
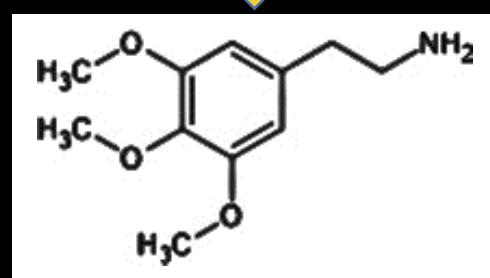
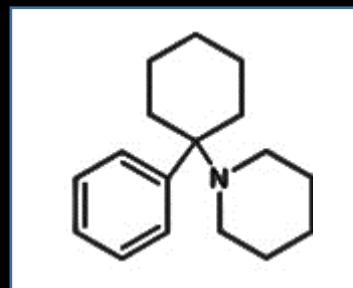
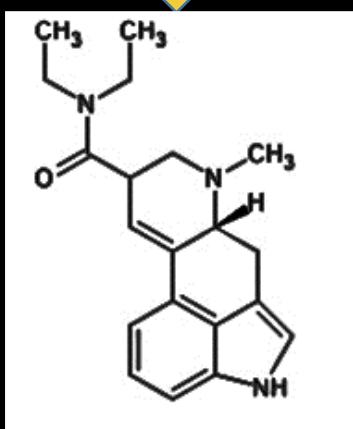
Hallucinogens



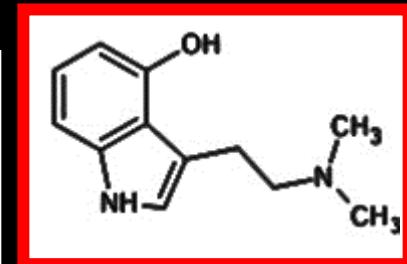
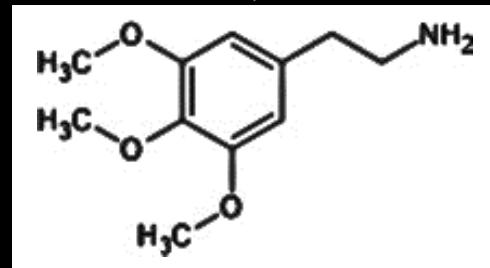
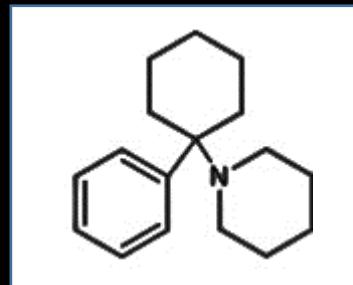
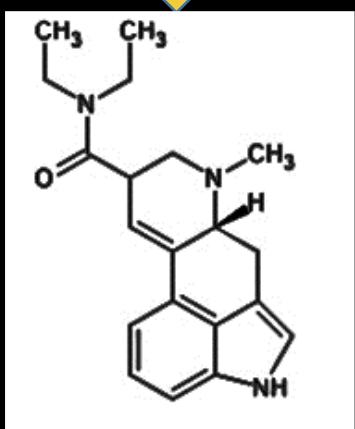
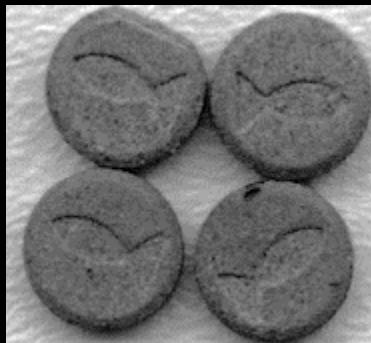
Hallucinogens

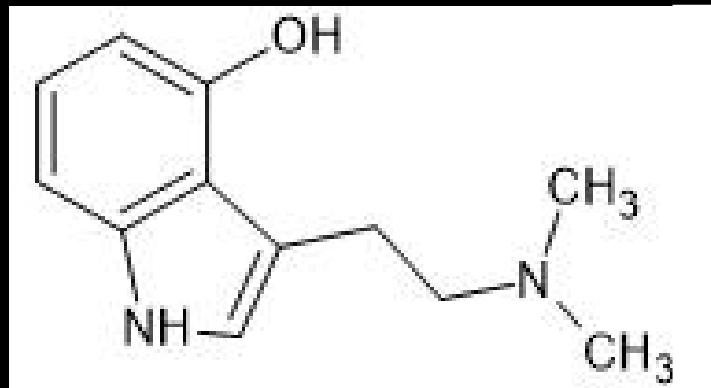


Hallucinogens

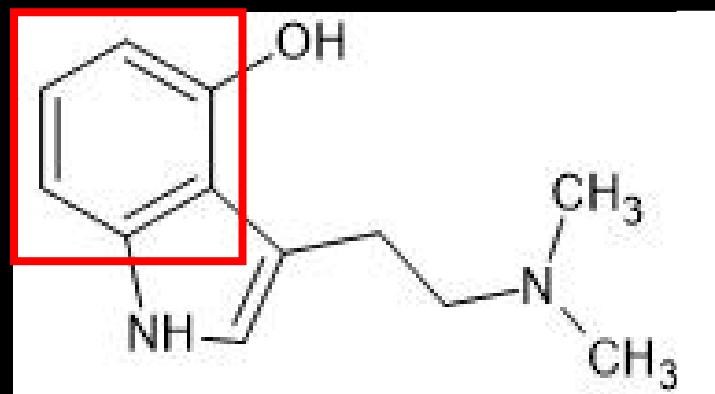


Hallucinogens

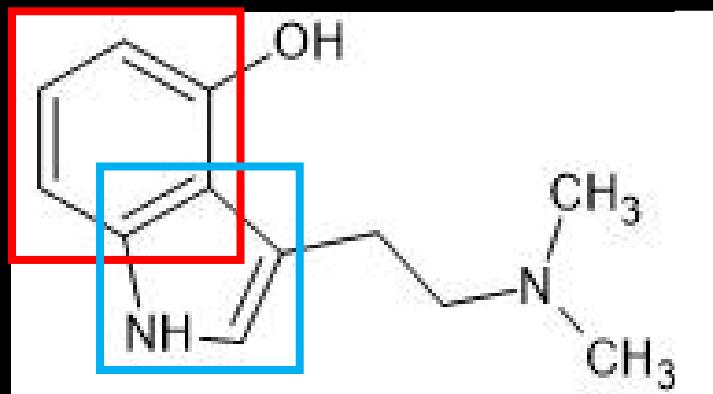




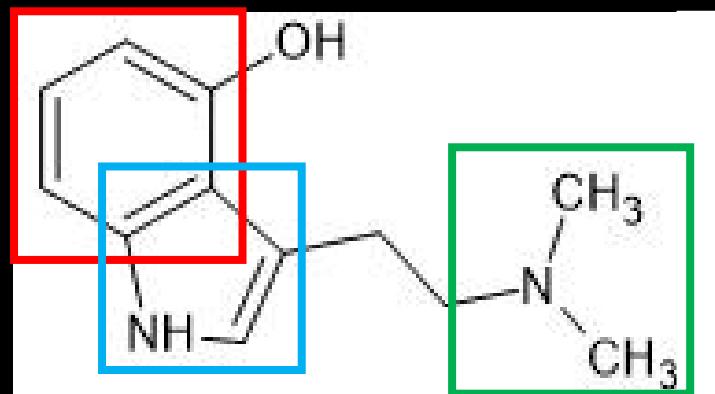
Psilocin



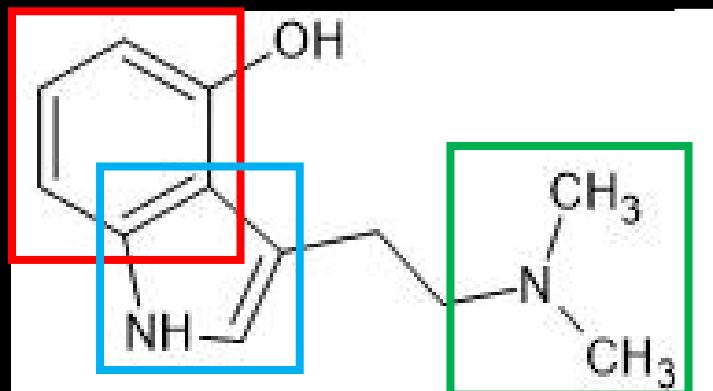
Psilocin



Psilocin



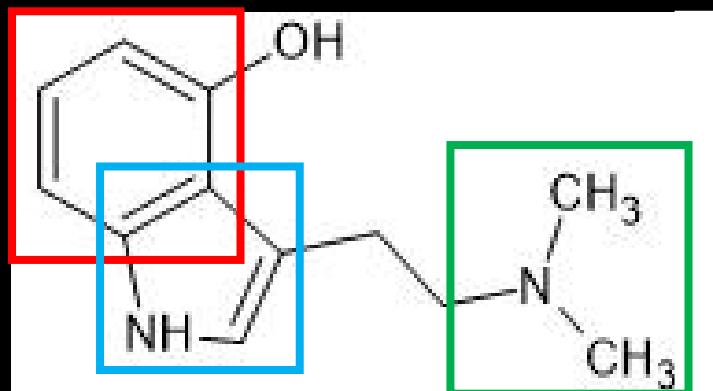
Psilocin



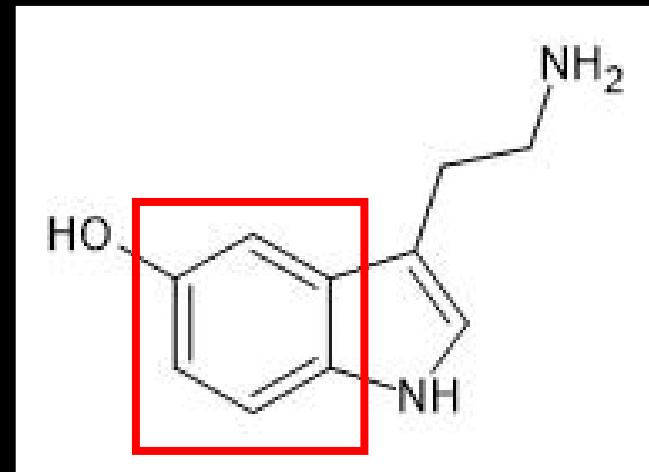
Psilocin



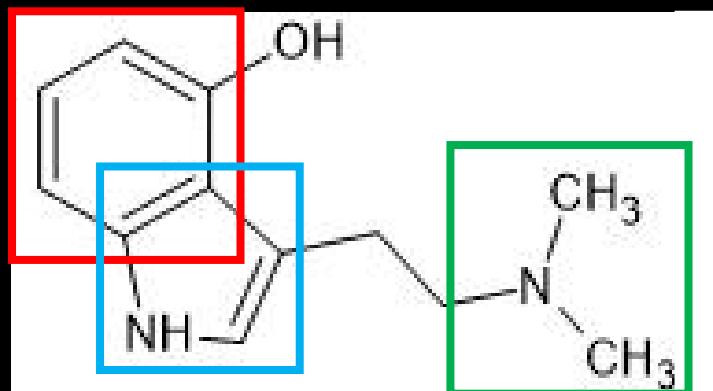
Serotonin



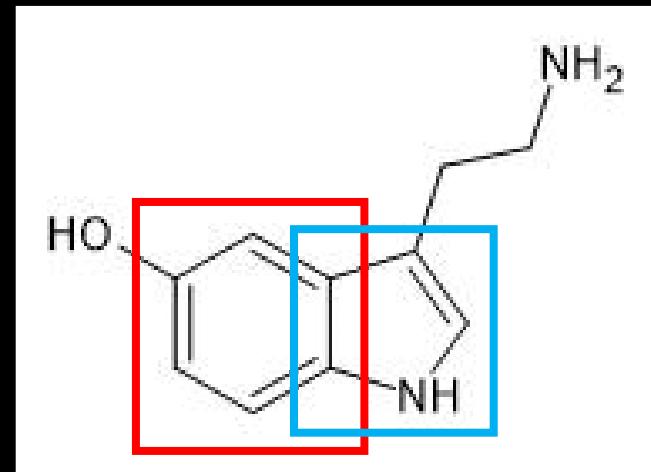
Psilocin



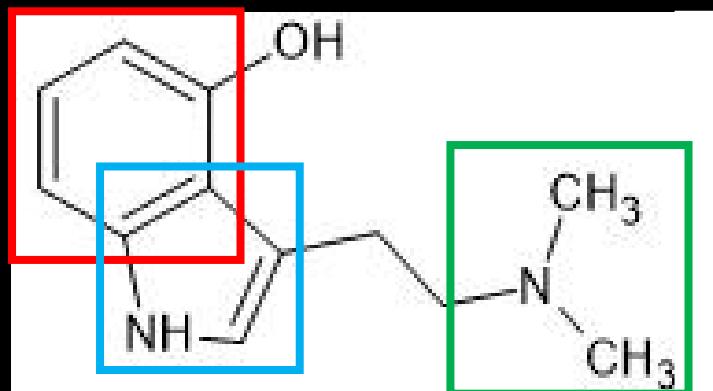
Serotonin



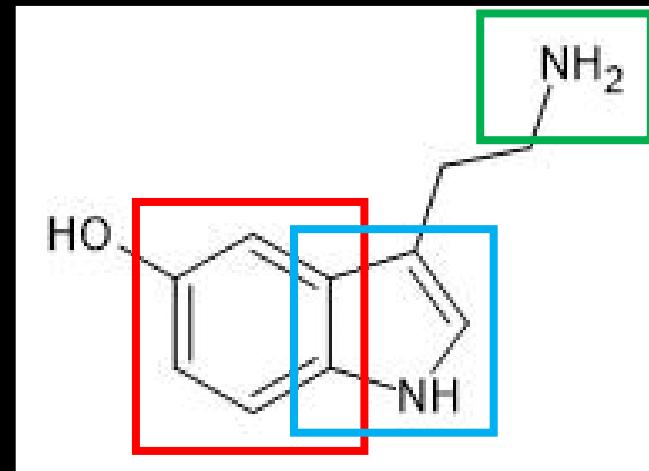
Psilocin



Serotonin

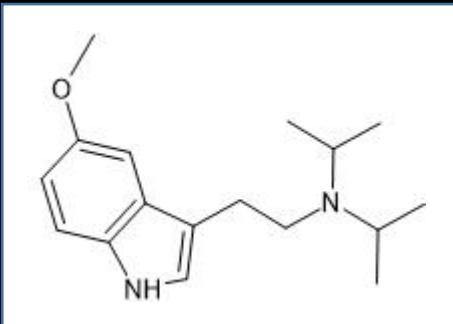


Psilocin

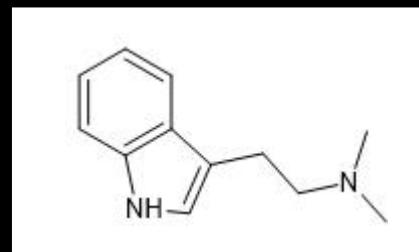


Serotonin

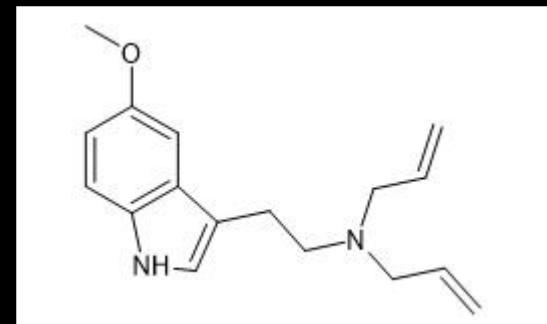
2011-2015 NFLIS Report



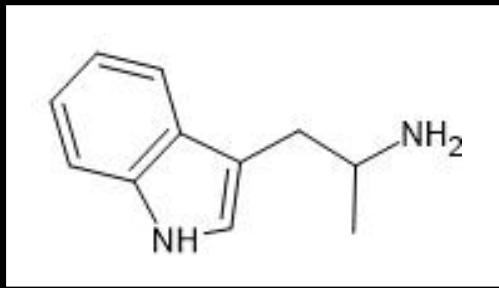
5-MeO-DiPT



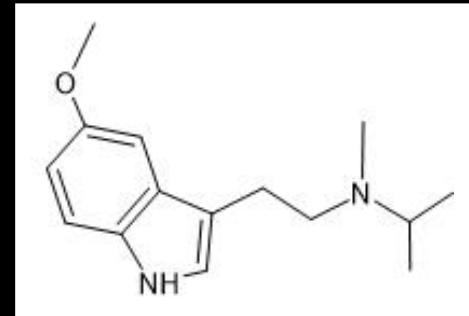
DMT



5-MeO-DALT



AMT



5-MeO-MiPT

Lab Analysis



Lab Analysis



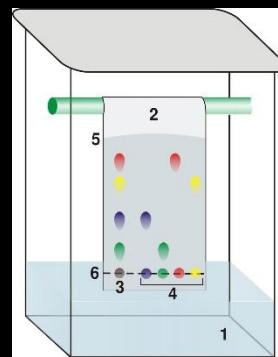
Lab Analysis



Lab Analysis

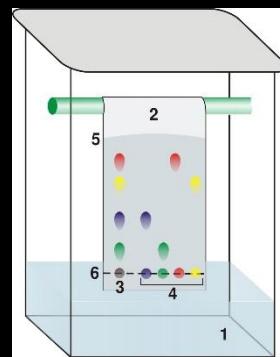


Lab Analysis



Lab vs Academia

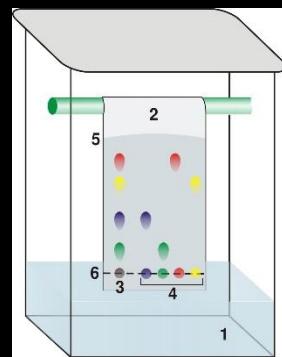
Ion mobility
spectrometry



Lab vs Academia

Ion mobility
spectrometry

LC-MS

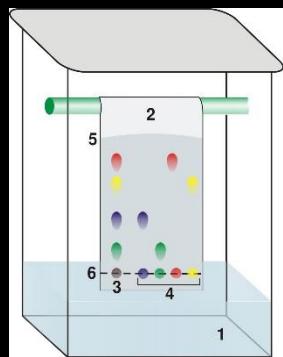


Lab vs Academia

Ion mobility
spectrometry

LC-MS

DART







1972



HPTLC

- Sensitivity

HPTLC

- Sensitivity
- Resolution

HPTLC

- Sensitivity
- Resolution
- Documentation

HPTLC

- Sensitivity
- Resolution
- Documentation
- Time efficient

HPTLC

- Sensitivity
- Resolution
- Documentation
- Time efficient
- “Green”

Literature Search

Name	Ratio	Reagents

Literature Search

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MP1	100:1.5	methanol: ammonium hydroxide

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MP1	100:1.5	methanol: ammonium hydroxide
MP2	2:1:1	n-butanol: water: glacial acetic acid

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MP3	75:15:10	cyclohexane: toluene: diethylamine

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MP4	2:1	n-propanol: 5% ammonium hydroxide

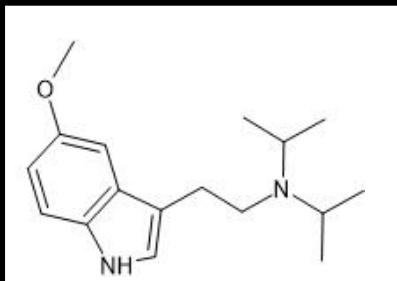
Literature Search

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MP5	4:1	chloroform: methanol

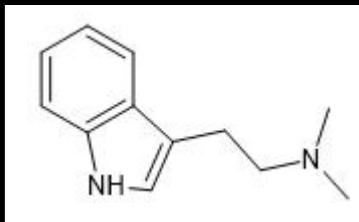
Literature Search

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MP5	4:1	chloroform: methanol
MP6	75:10:15	methanol: glacial acetic acid: water

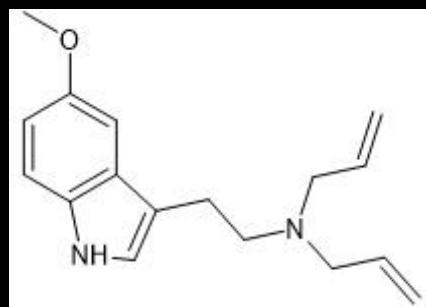
Compounds Selected



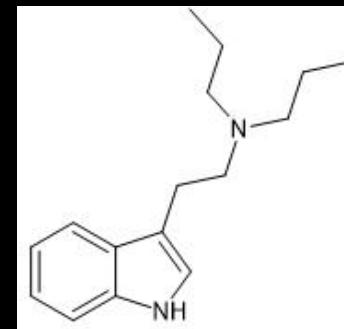
5-MeO-DiPT



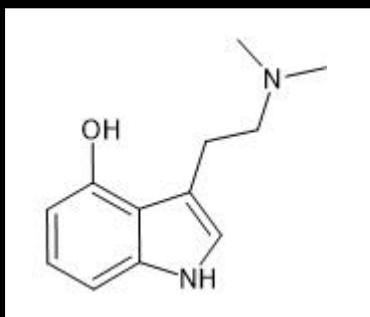
DMT



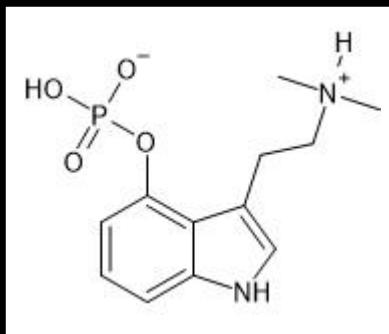
5-MeO-DALT



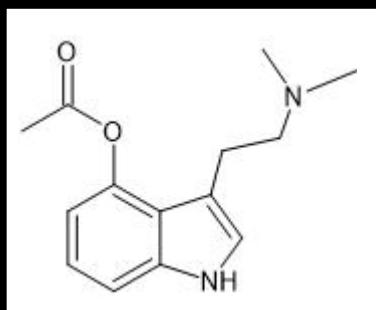
DPT



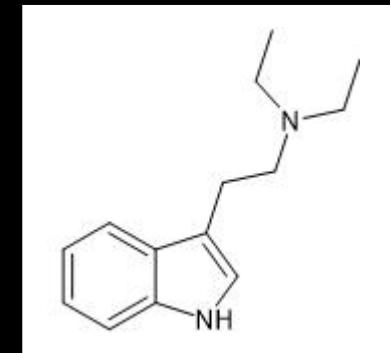
Psilocin



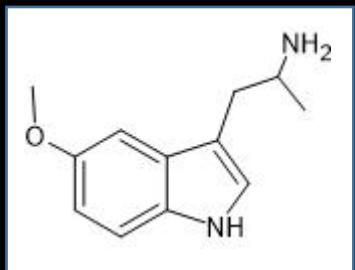
Psilocybin



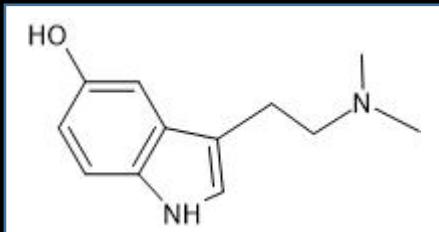
4-AcO-DMT



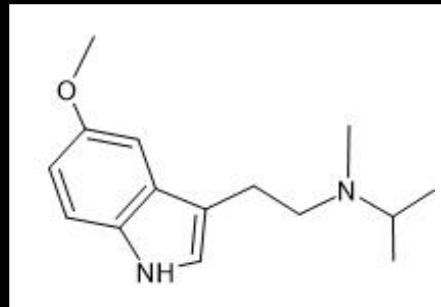
DET



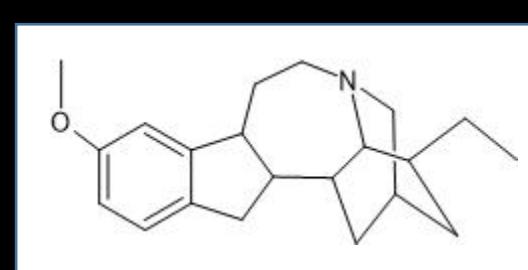
5-MeO-AMT



Bufotenine

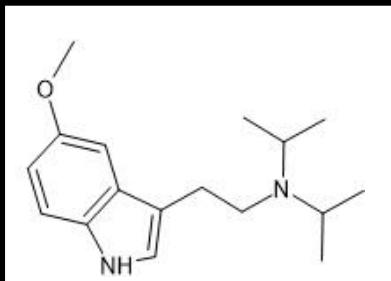


5-MeO-MiPT

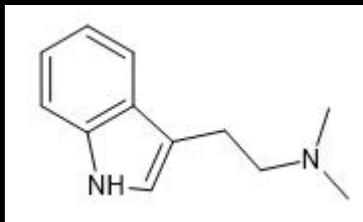


Ibogaine

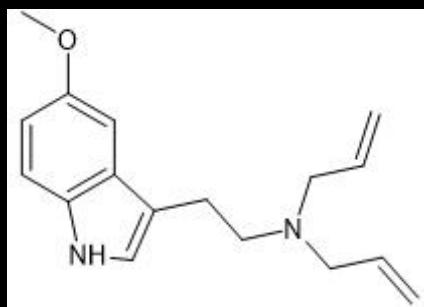
Compounds Selected



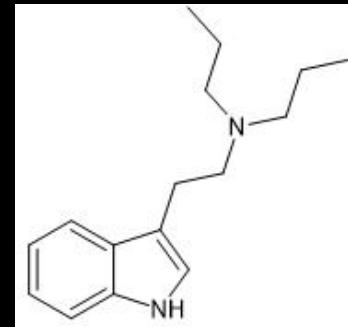
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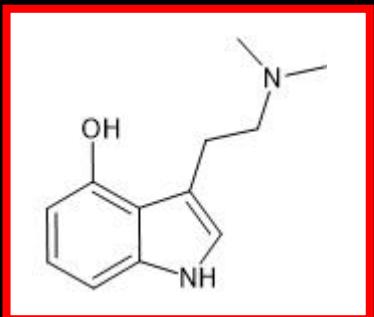
DMT



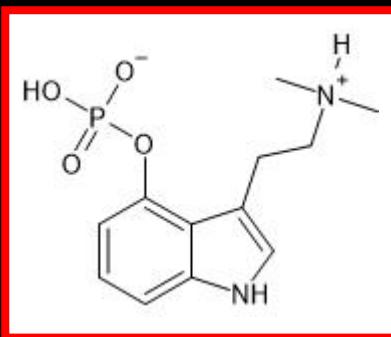
5-MeO-DALT



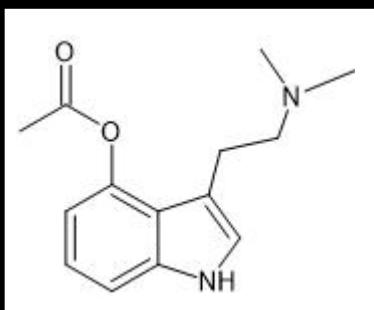
DPT



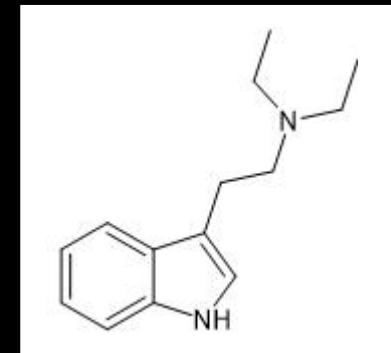
Psilocin



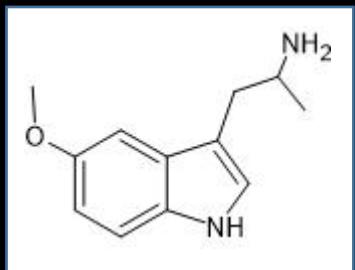
Psilocybin



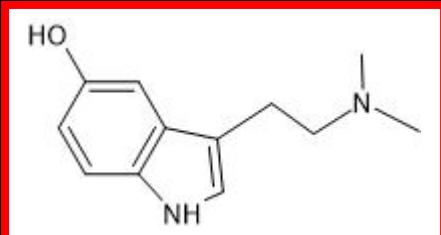
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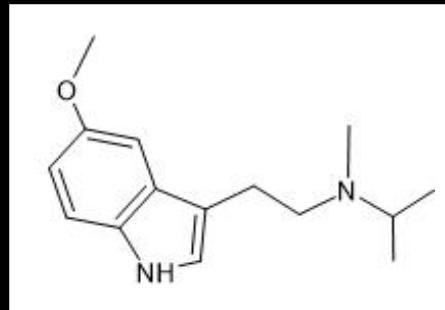
DET



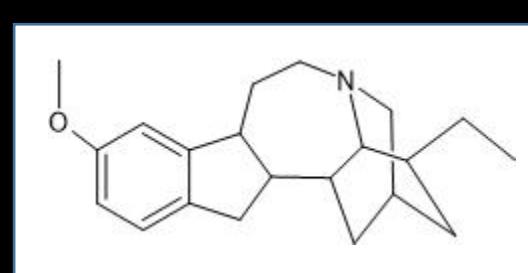
5-MeO-AMT



Bufotenine

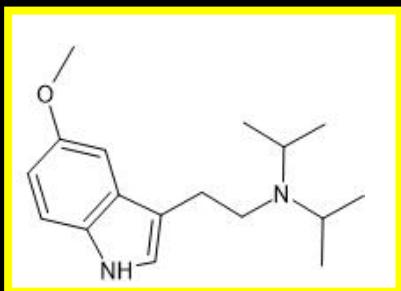


5-MeO-MiPT

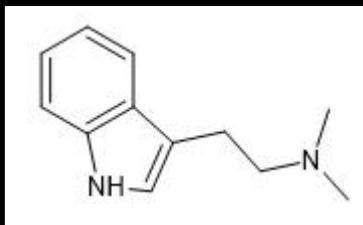


Ibogaine

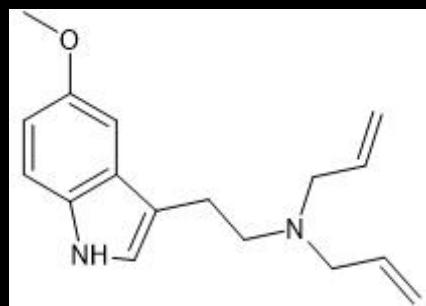
Compounds Selected



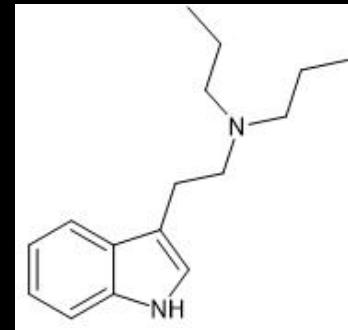
5-MeO-DiPT



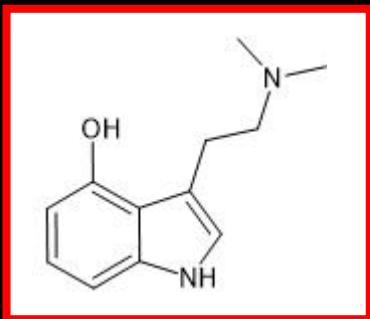
DMT



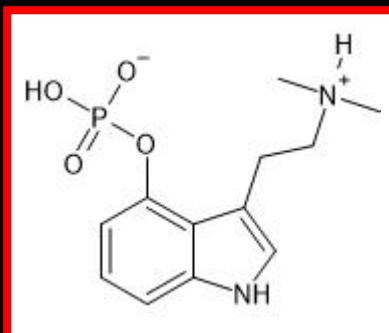
5-MeO-DALT



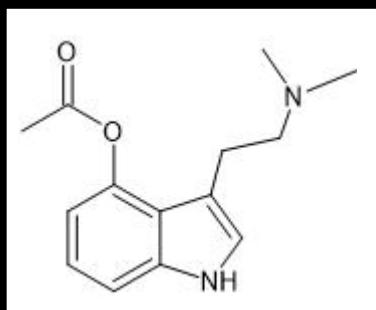
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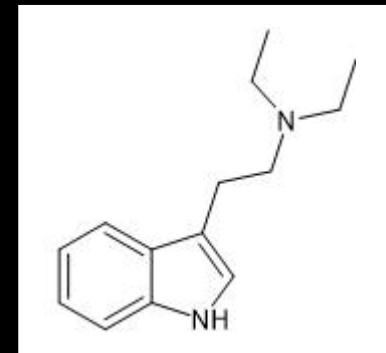
Psilocin



Psilocybin



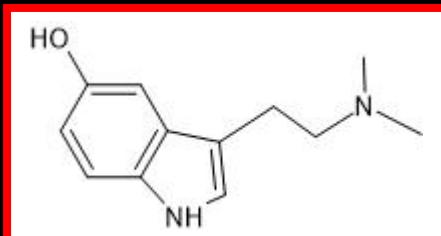
4-AcO-DMT



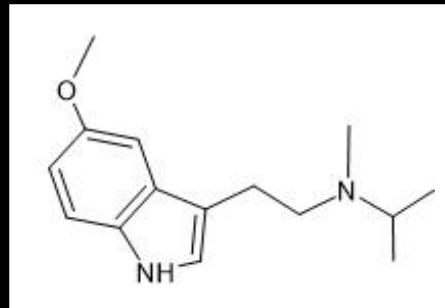
DET



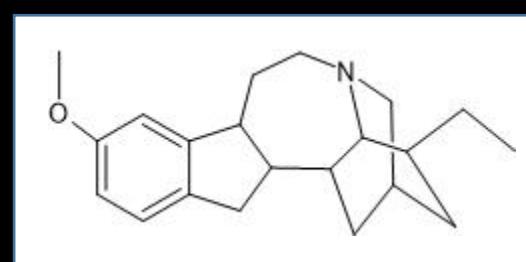
5-MeO-AMT



Bufotenine

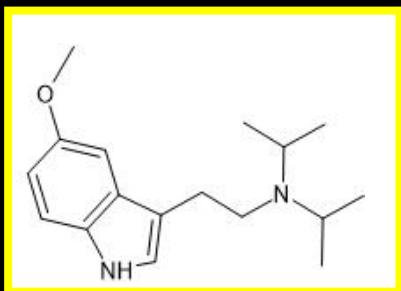


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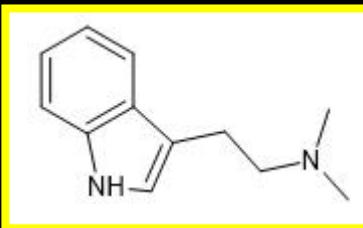


Ibogaine

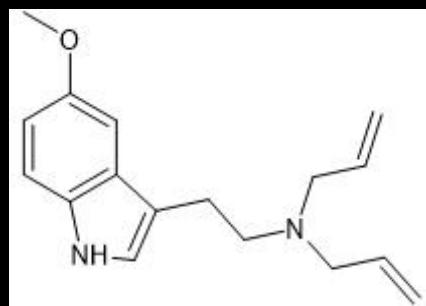
Compounds Selected



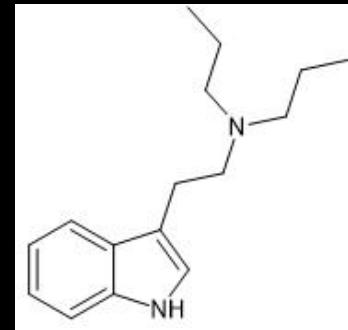
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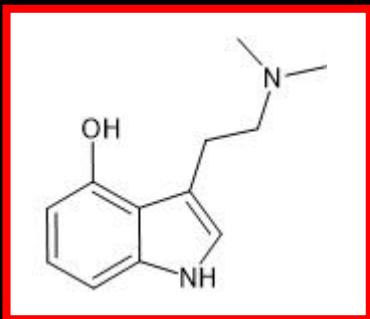
DMT



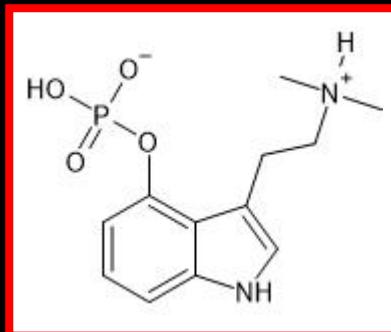
5-MeO-DALT



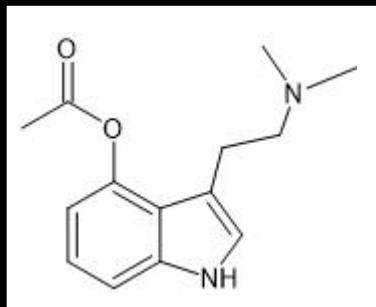
DPT



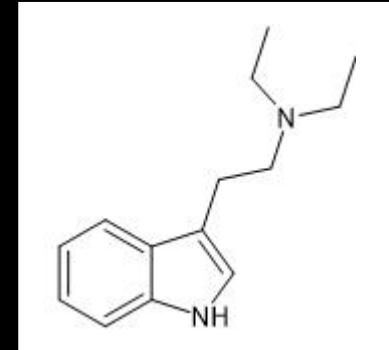
Psilocin



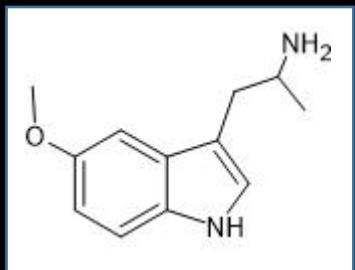
Psilocybin



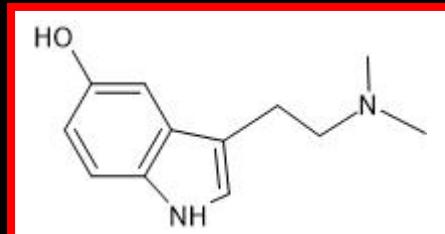
4-AcO-DMT



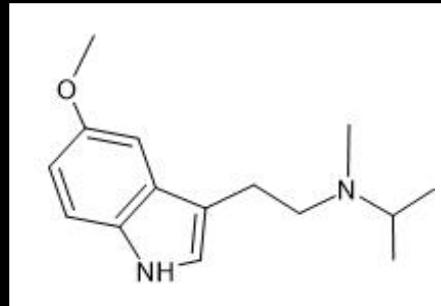
DET



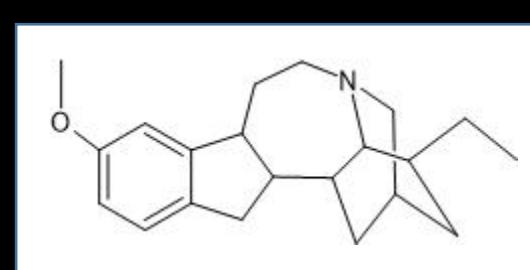
5-MeO-AMT



Bufotenine

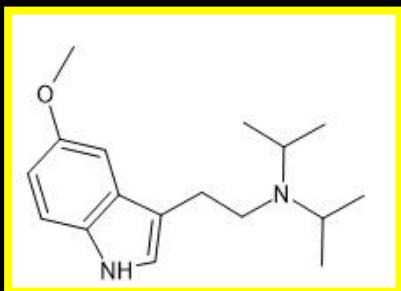


5-MeO-MiPT



Ibogaine

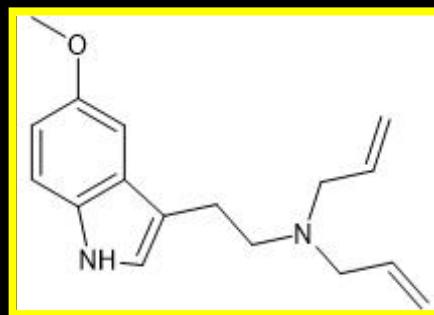
Compounds Selected



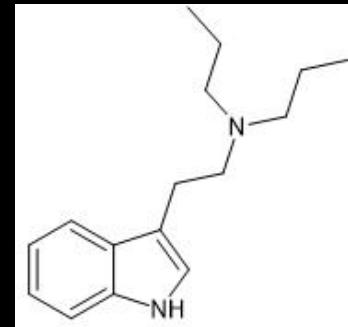
5-MeO-DiPT



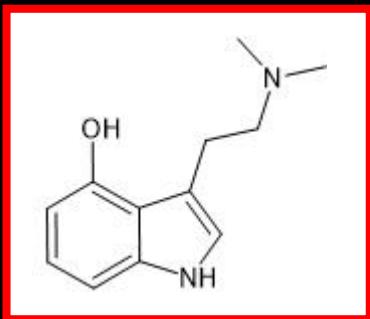
DMT



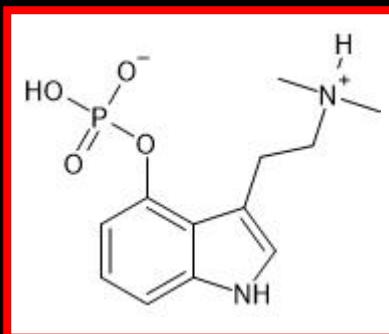
5-MeO-DALT



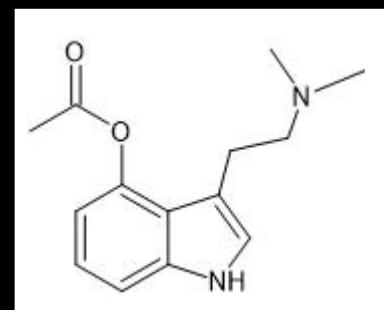
DPT



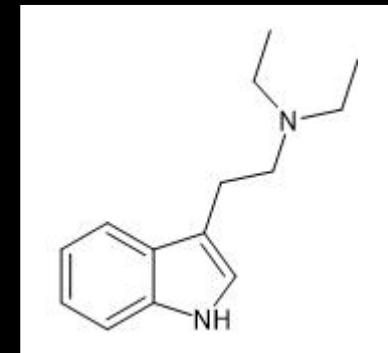
Psilocin



Psilocybin



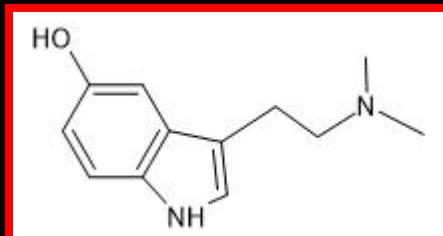
4-AcO-DMT



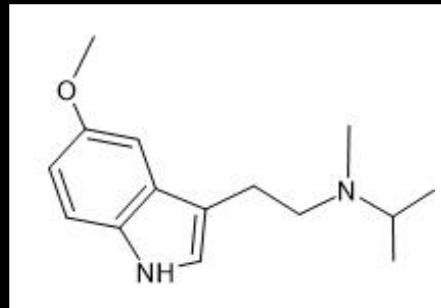
DET



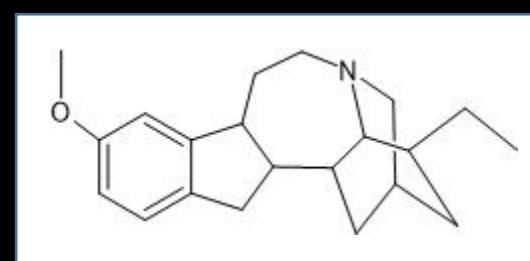
5-MeO-AMT



Bufotenine

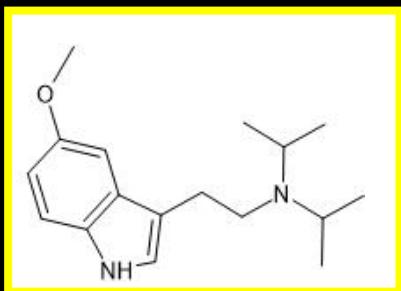


5-MeO-MiPT

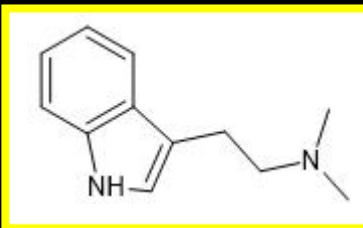


Ibogaine

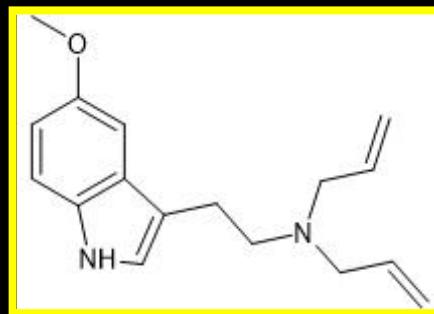
Compounds Selected



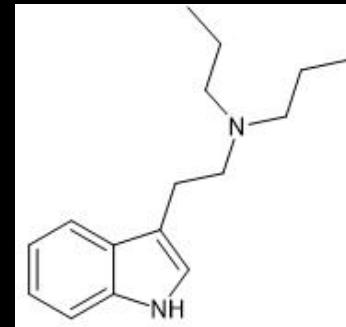
5-MeO-DiPT



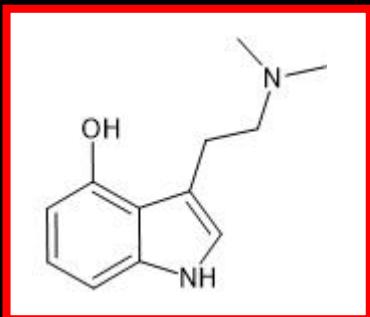
DMT



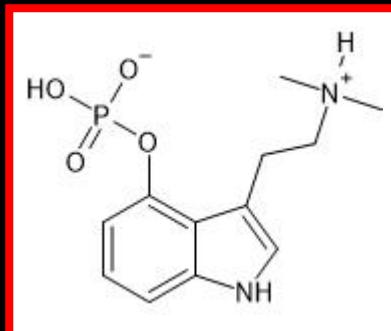
5-MeO-DALT



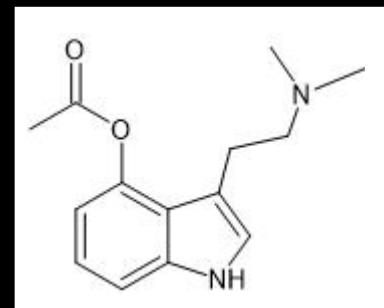
DPT



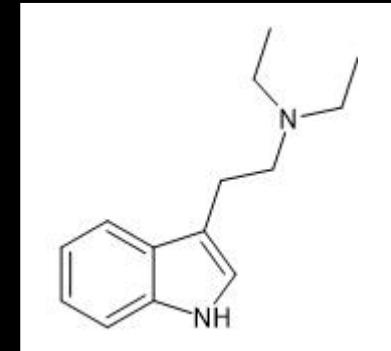
Psilocin



Psilocybin



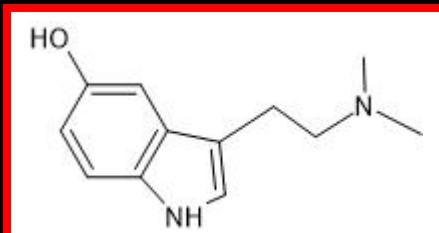
4-AcO-DMT



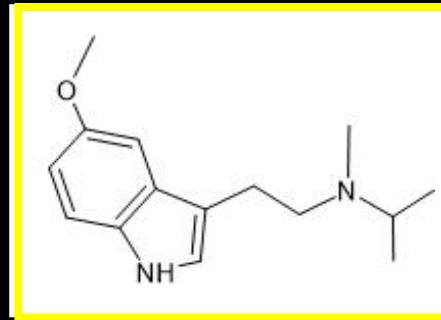
DET



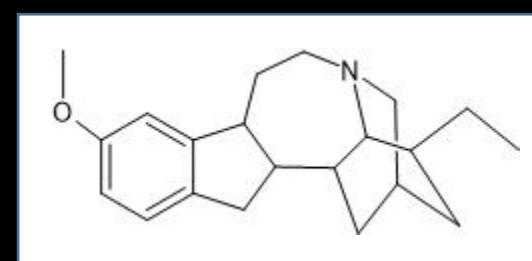
5-MeO-AMT



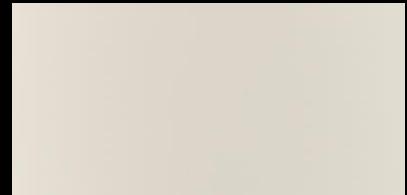
Bufotenine

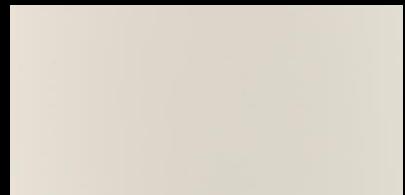


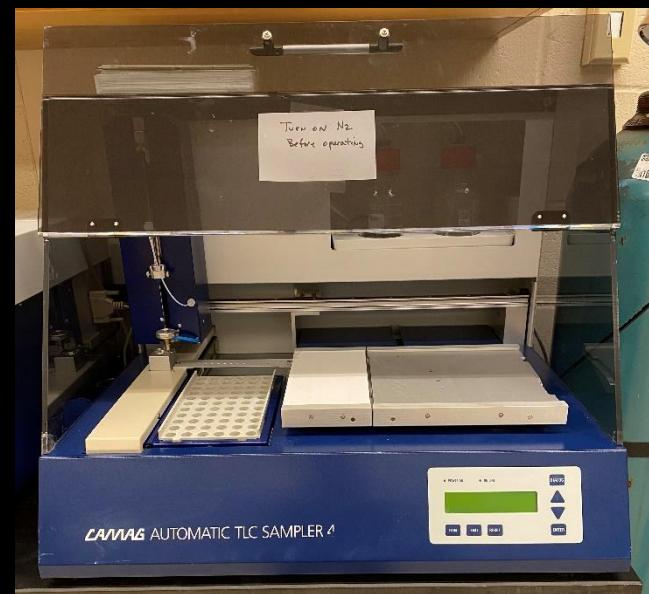
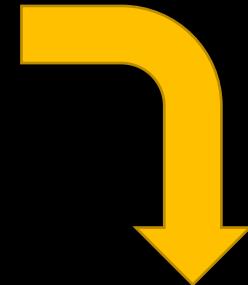
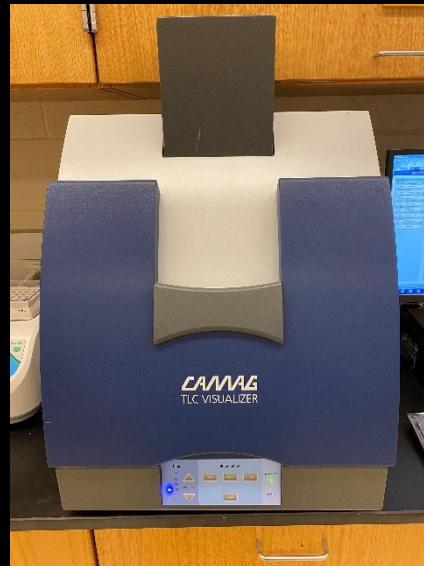
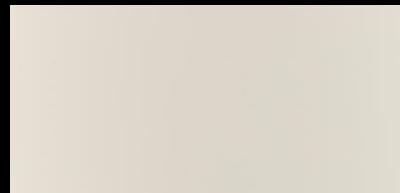
5-MeO-MiPT

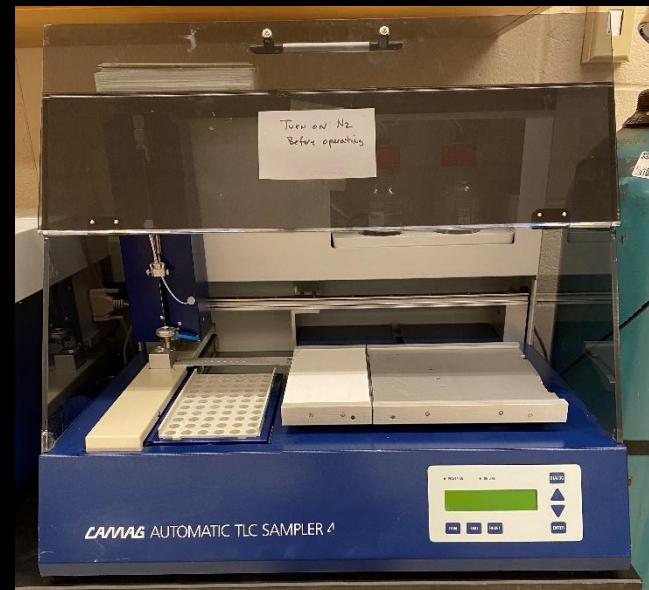
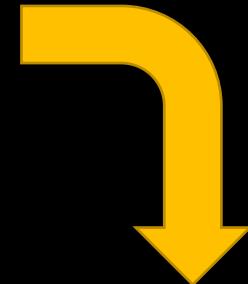
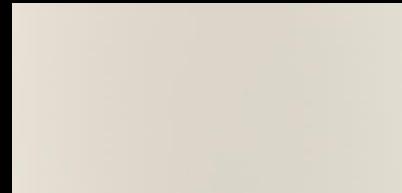


Ibogaine

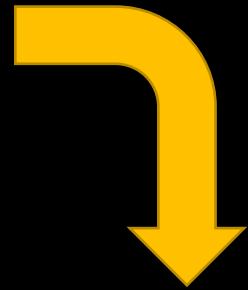


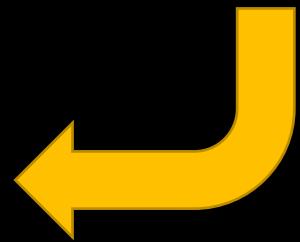
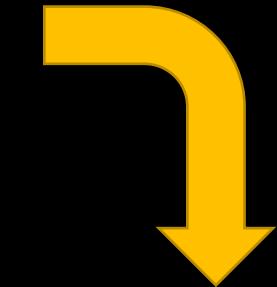


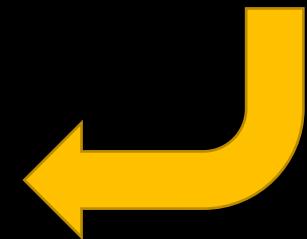
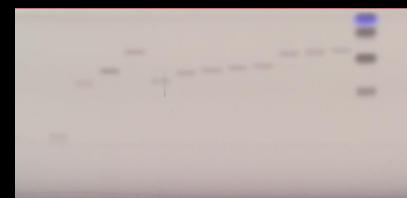
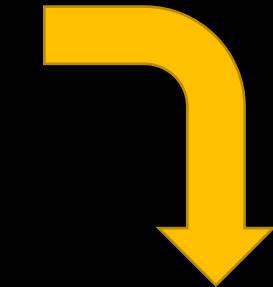
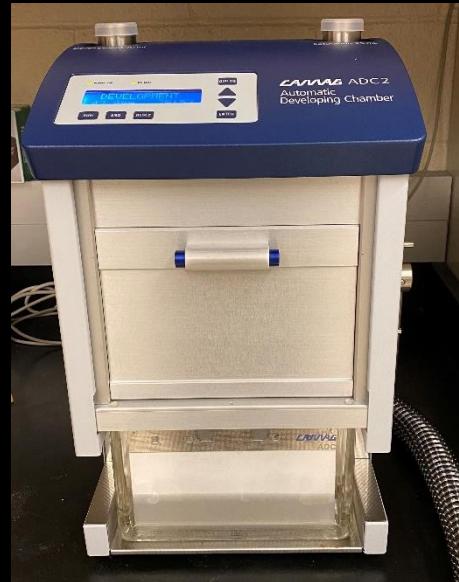


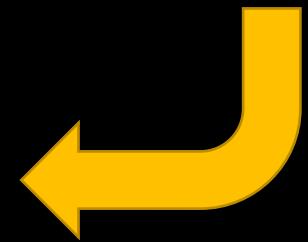
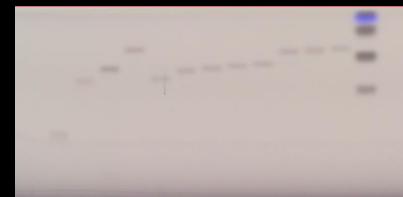
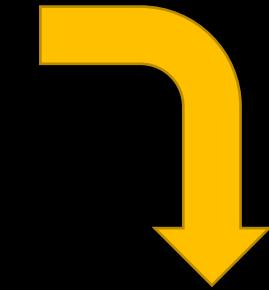


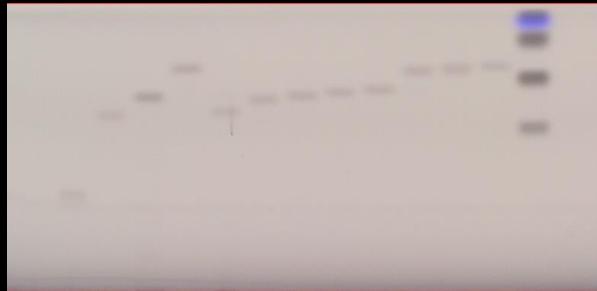


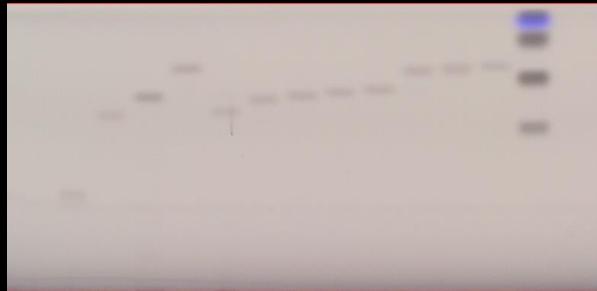






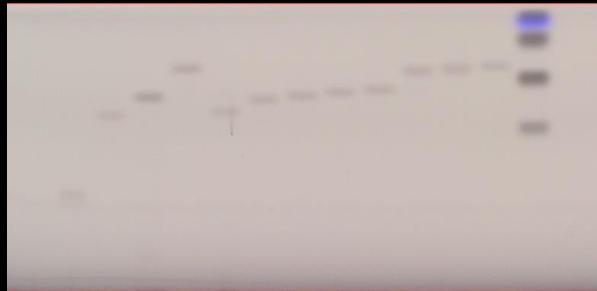






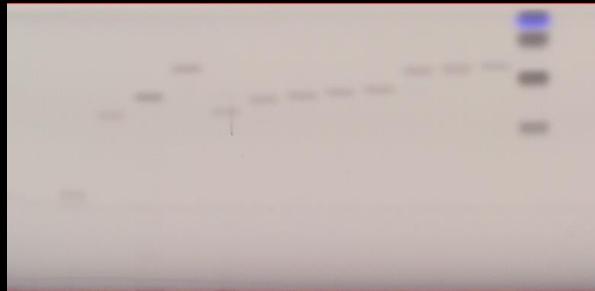
P-DMAB

A large, solid yellow arrow pointing horizontally to the right, indicating a process or reaction flow.



P-DMAB



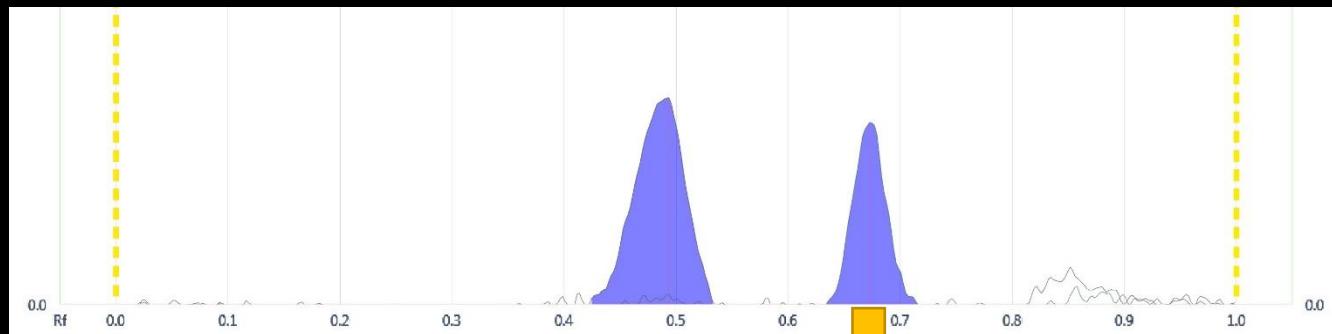


P-DMAB



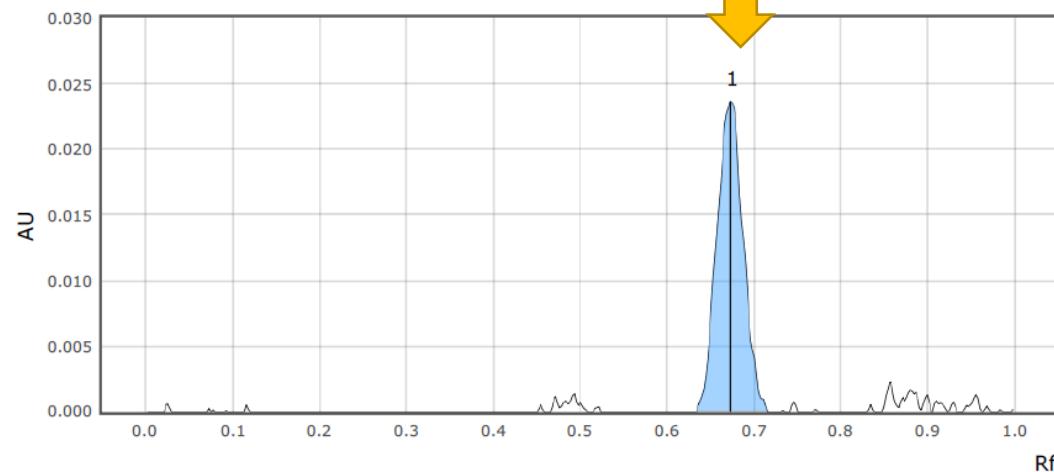
Data Analysis with
VisionCATS software





Track 11:

Type	Sample
Vial ID	5-MeO-AMT
Description	5-MeO-AMT 250 ug/mL
Volume	2.0 μ L



Peak #	Start		Max			End		Area		Manual peak	Substance Name
	Rf	H	Rf	H	%	Rf	H	A	%		
1	0.634	0.0000	0.673	0.0236	100.00	0.716	0.0000	0.00084	100.00	No	5-MeO-AMT

Mobile Phase Evaluation

- Detection and travel

Mobile Phase Evaluation

- Detection and travel
- Resolution

Mobile Phase Evaluation

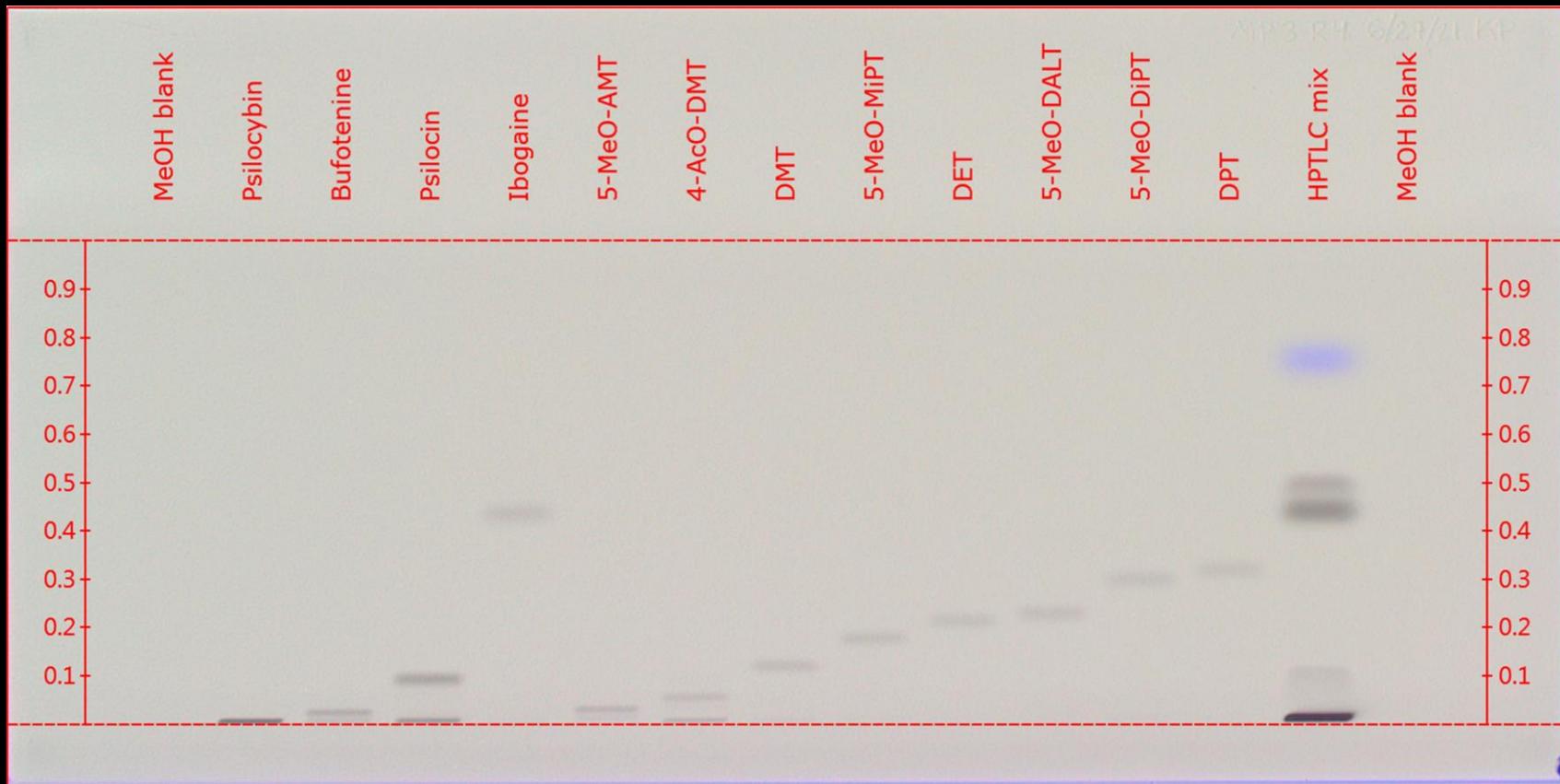
- Detection and travel
- Resolution
- Reproducibility

Mobile Phase Evaluation

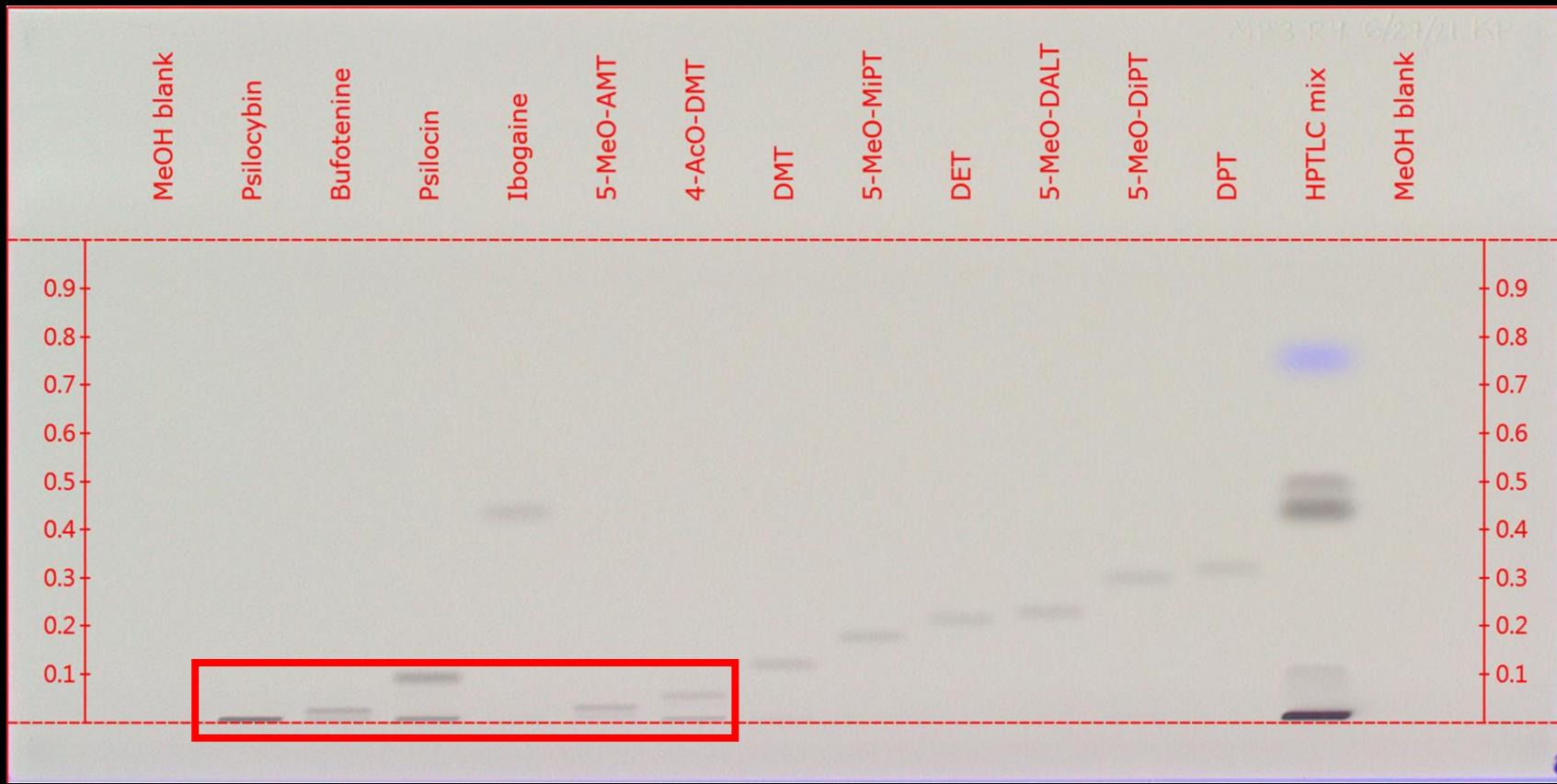
- Detection and travel
- Resolution
- Reproducibility
- Reagent

Mobile Phase Evaluation

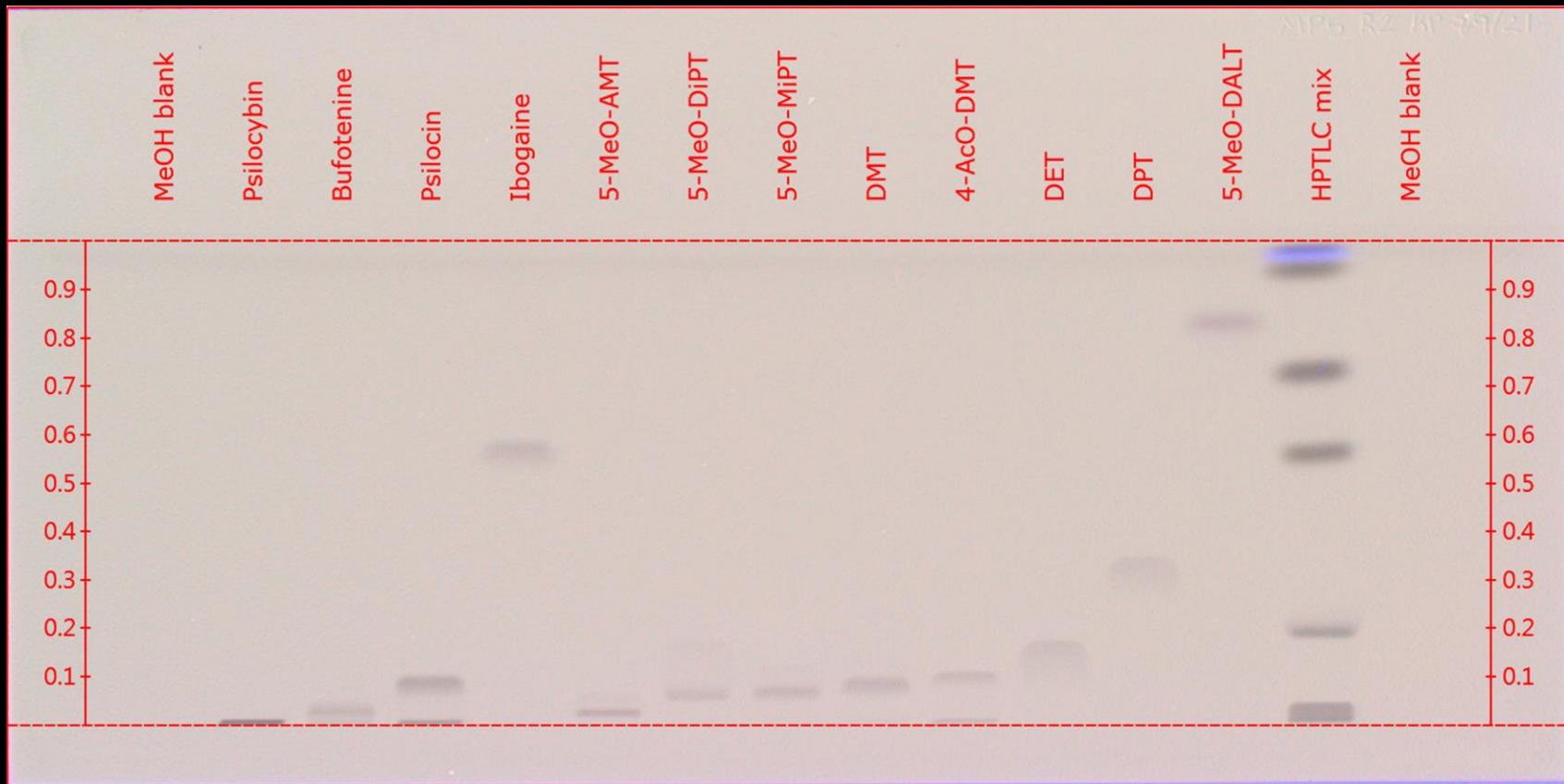
- Detection and travel
- Resolution
- Reproducibility
- Reagent
- R_F values



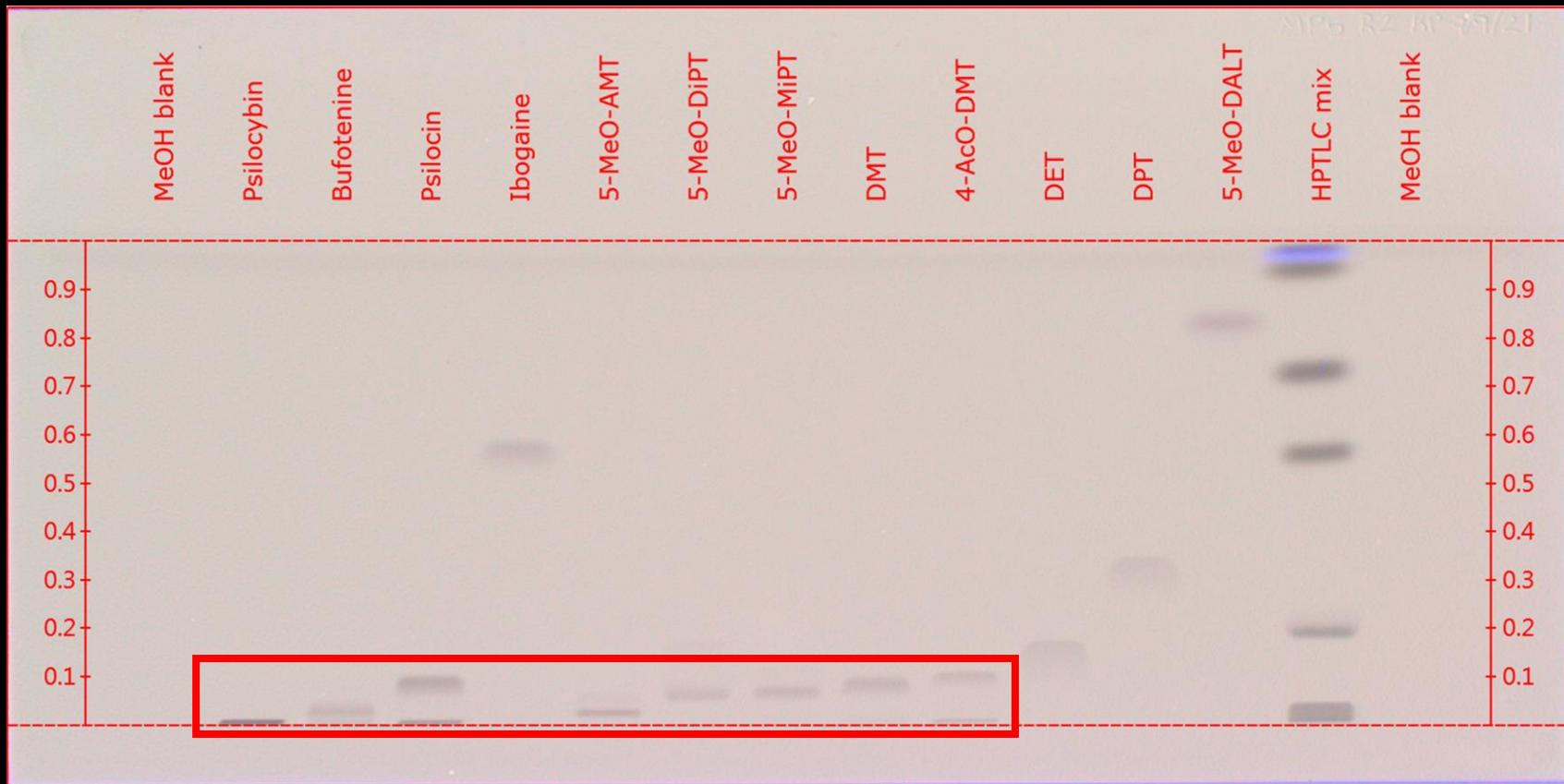
MP 3
75:15:10 cyclohexane: toluene: diethylamine



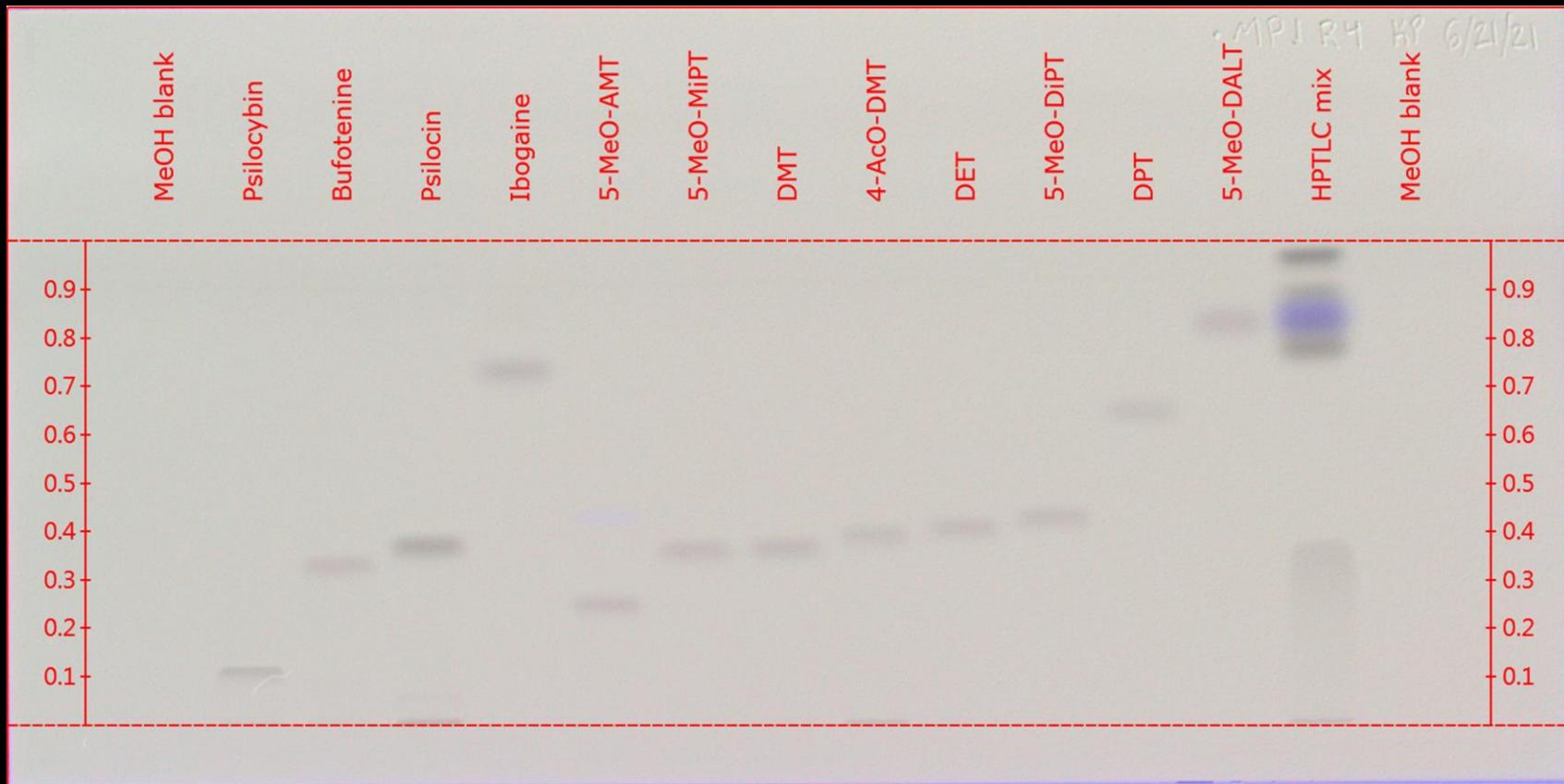
MP 3
75:15:10 cyclohexane: toluene: diethylamine



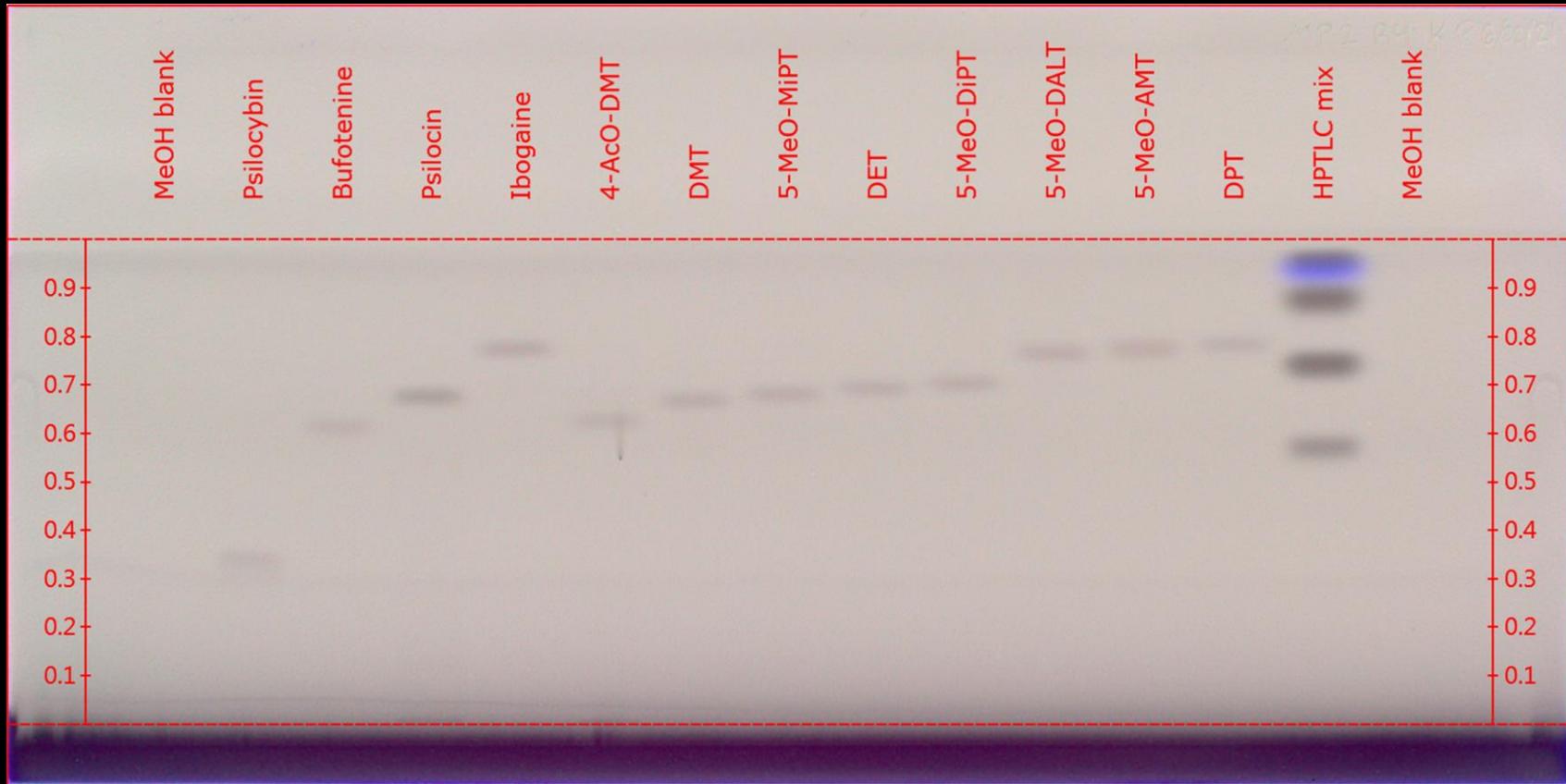
MP 5
4:1 chloroform: methanol

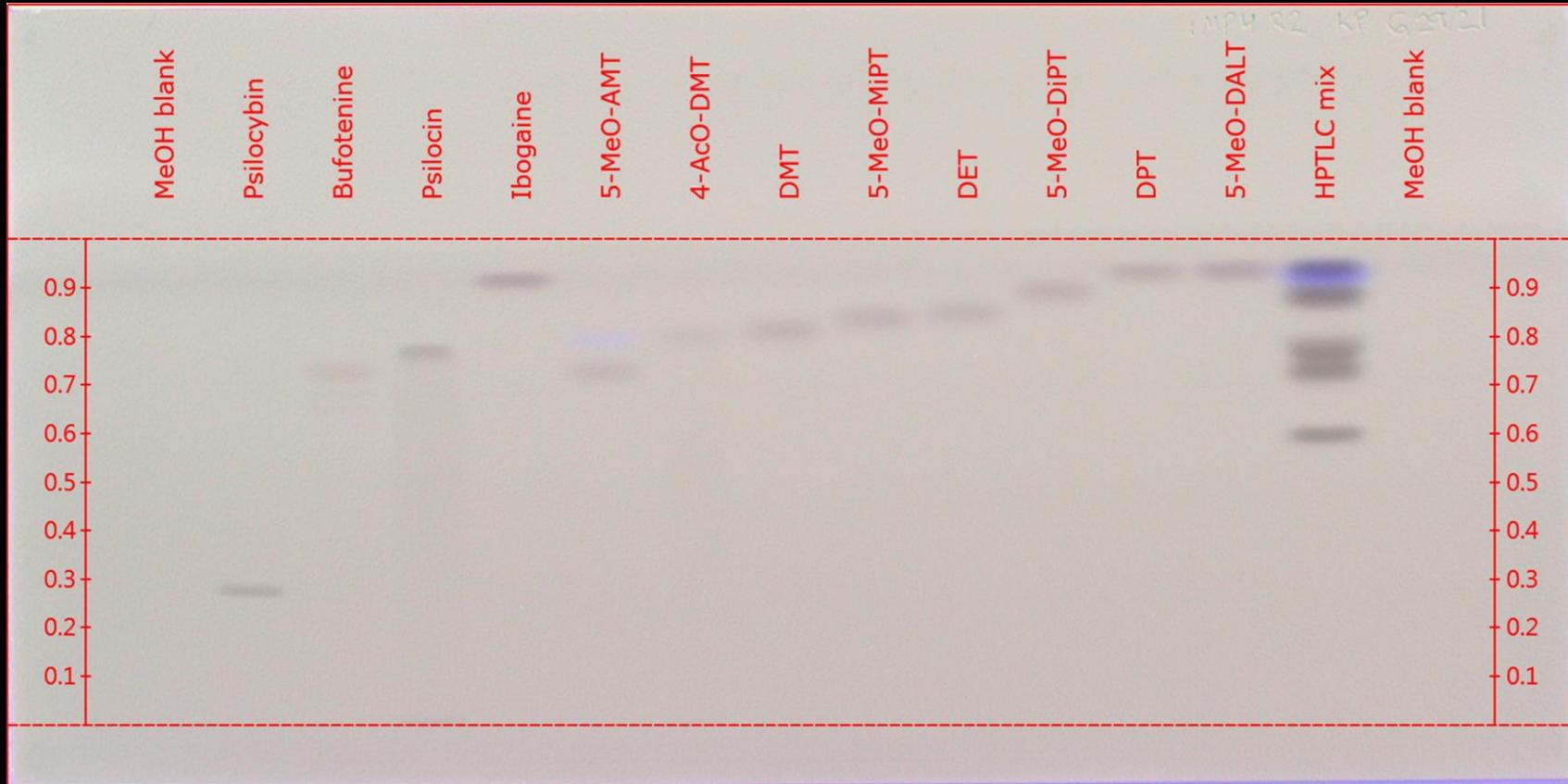


MP 5
4:1 chloroform: methanol

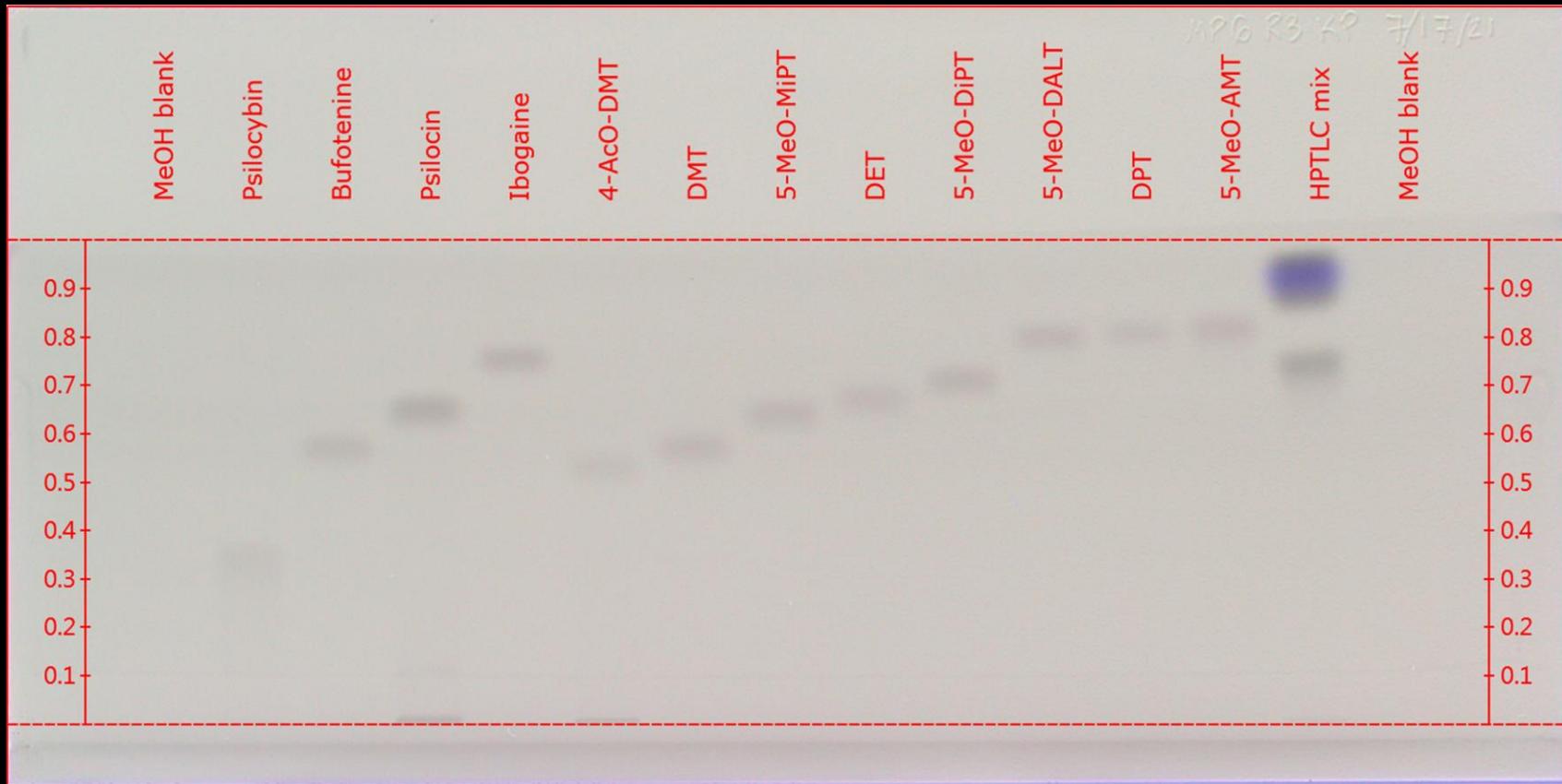


MP 1
100:1.5 methanol: ammonium hydroxide





MP 4
2:1 n-butanol: 5% ammonium hydroxide

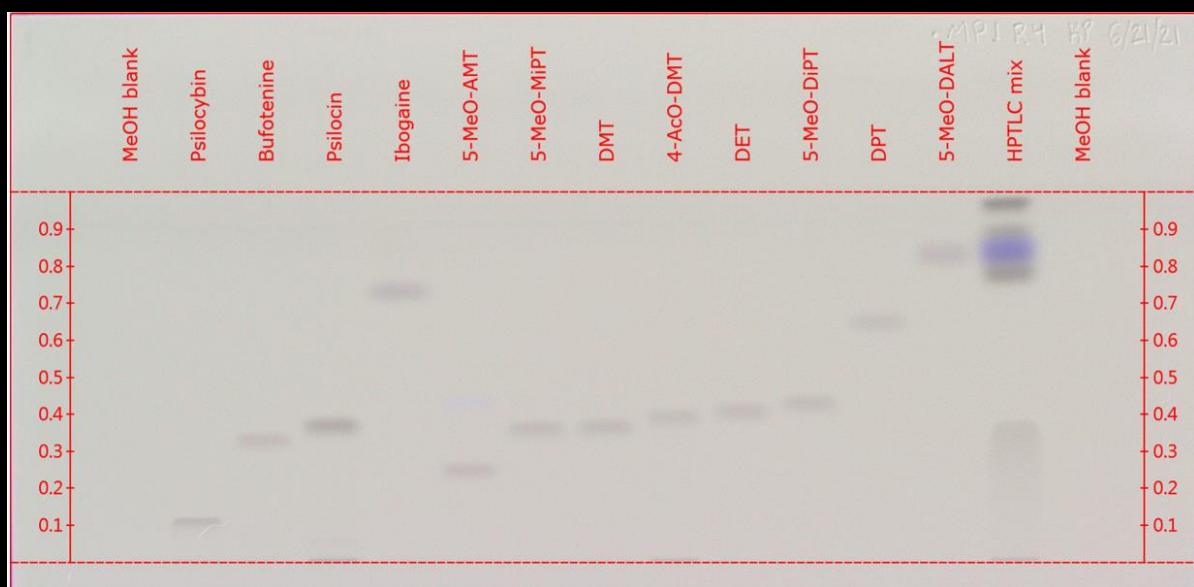


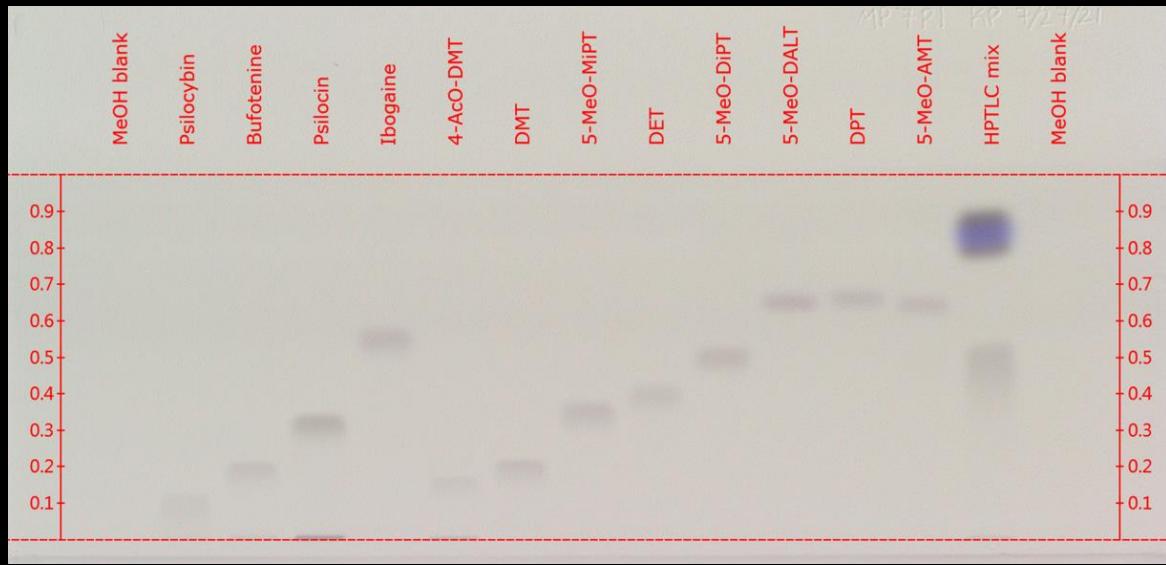
MP 6
75:10:15 methanol: glacial acetic acid: water



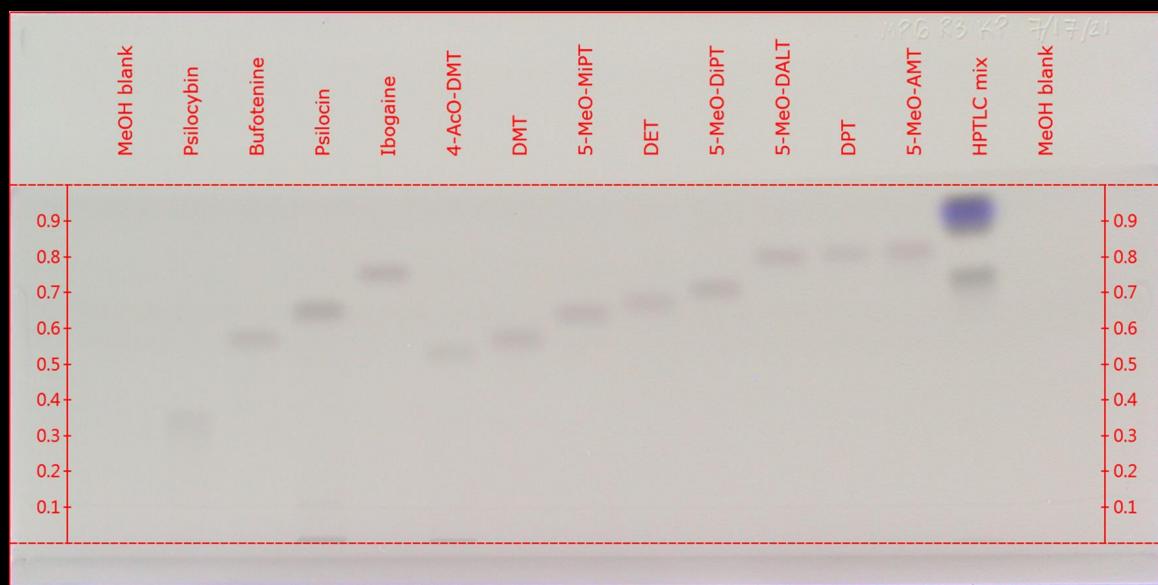
MP 7
100:1.5 methanol: glacial acetic acid

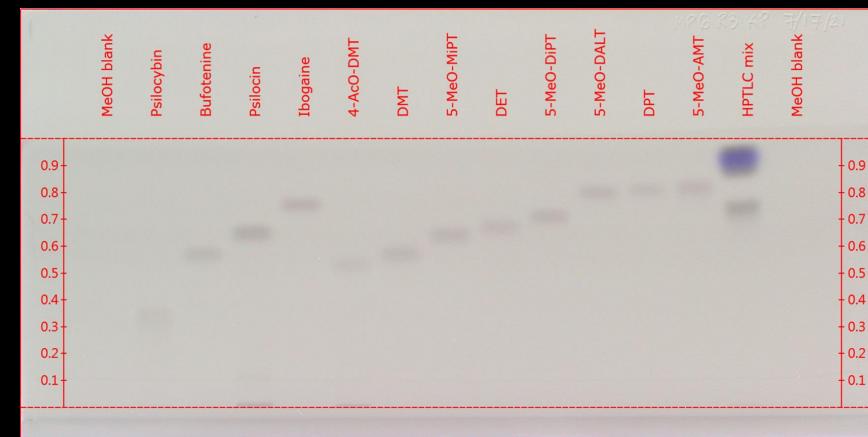
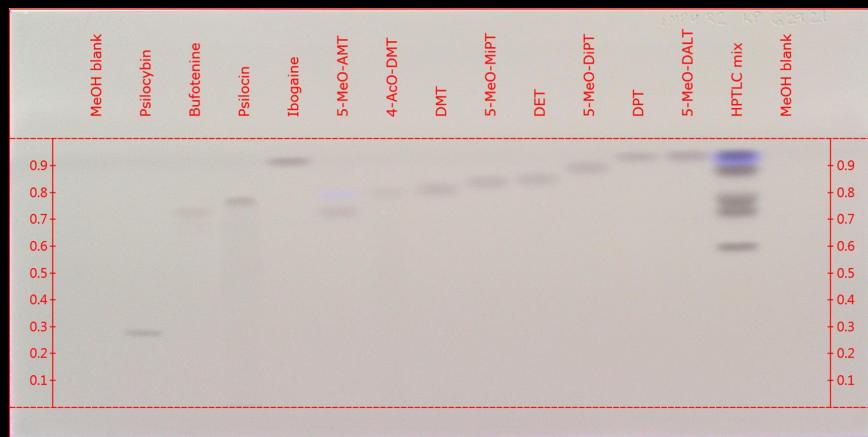
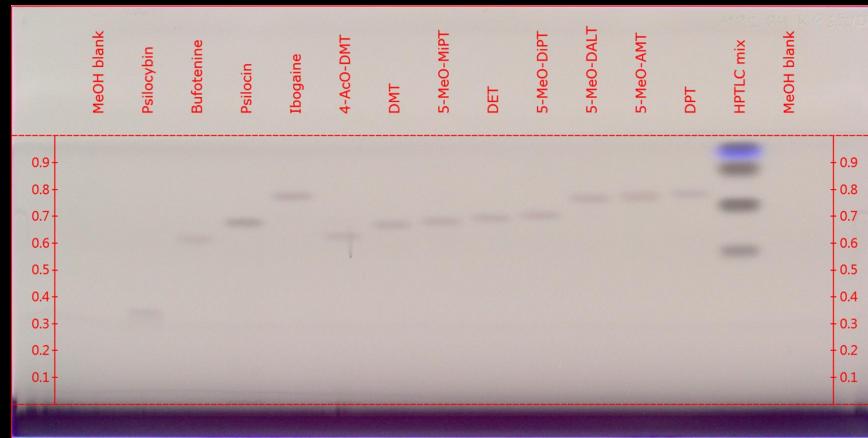
MP 1
100:1.5 methanol:
ammonium hydroxide

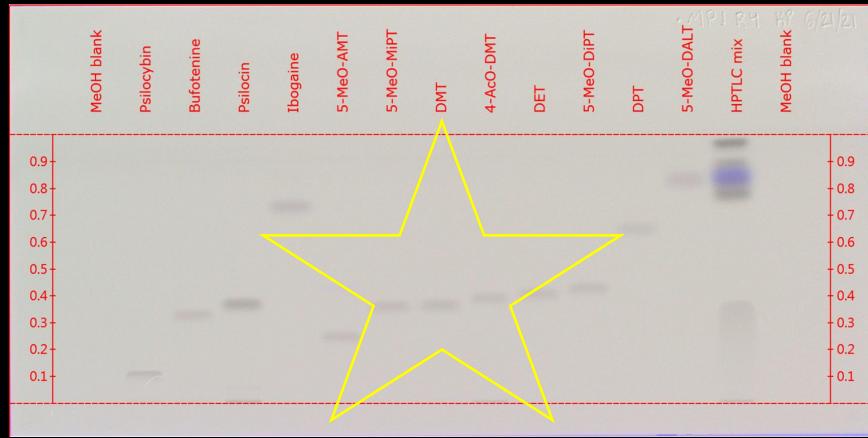




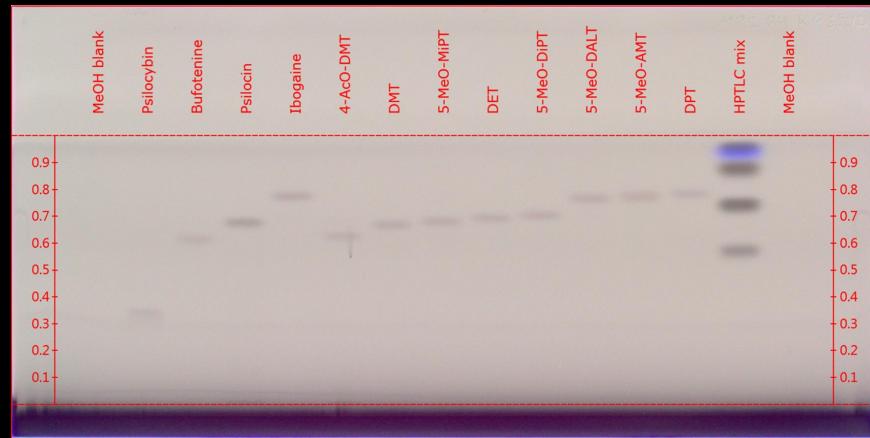
MP 6
75:10:15 methanol: glacial acetic acid: water



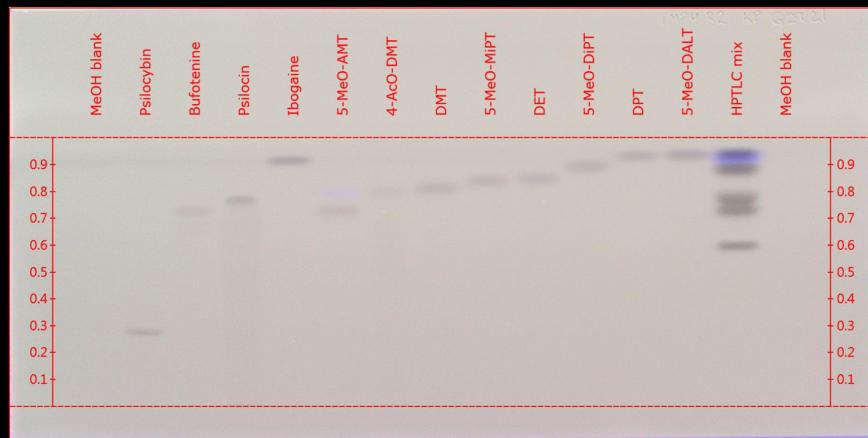




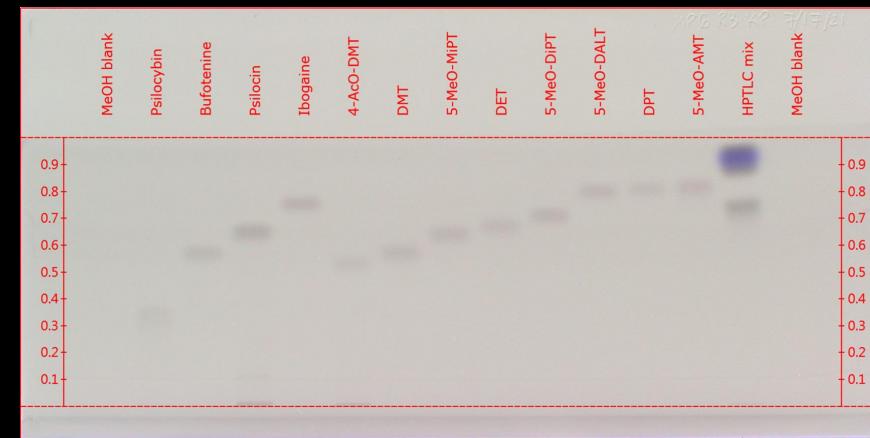
MP 1
100:1.5 methanol: ammonium hydroxide



MP 2
2:1:1 n-butanol: water: glacial acetic acid



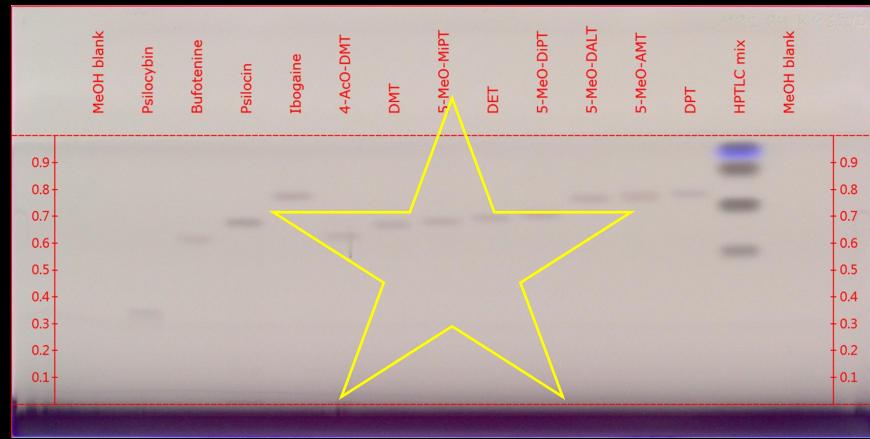
MP 4
2:1 n-propanol: 5% ammonium hydroxide



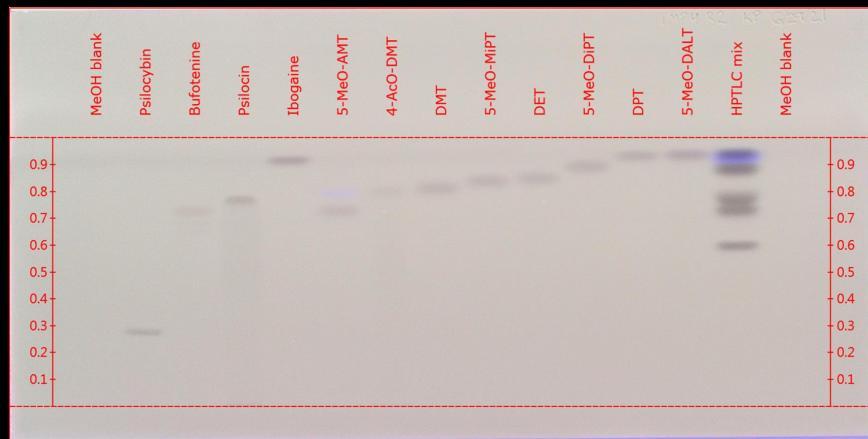
MP 6
75:10:15 methanol: glacial acetic acid: water



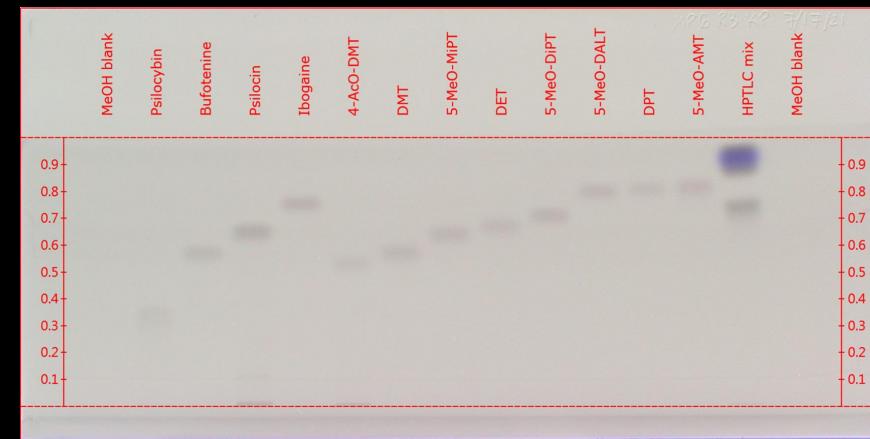
MP 1
100:1.5 methanol: ammonium hydroxide



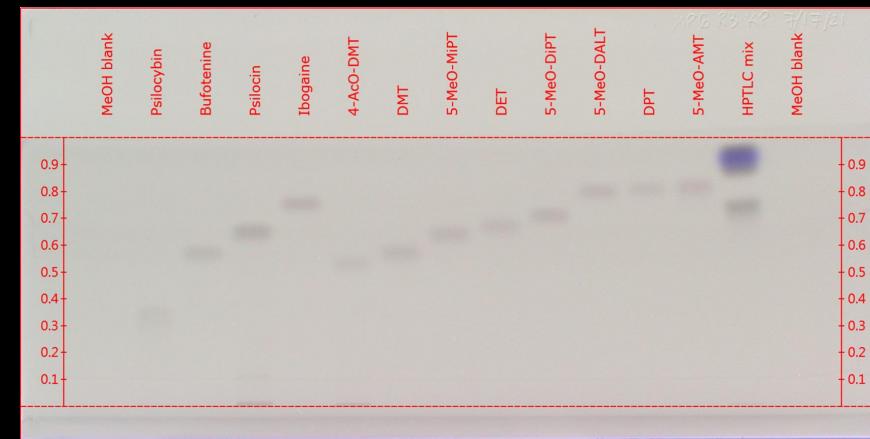
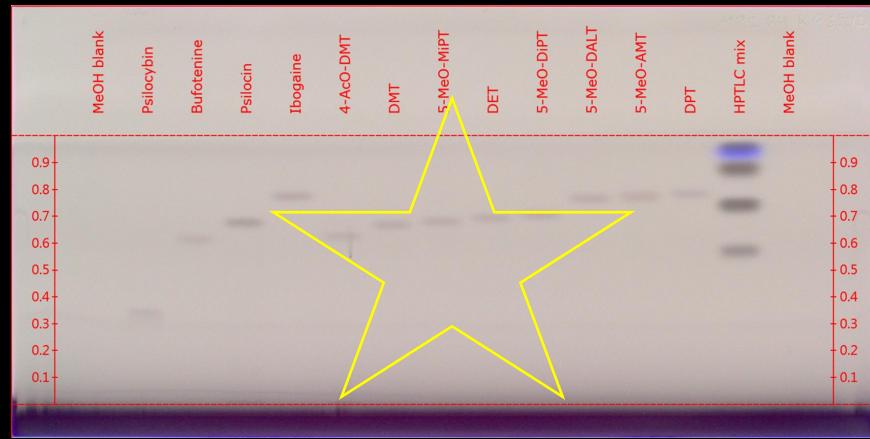
MP 2
2:1:1 n-butanol: water: glacial acetic acid



MP 4
2:1 n-propanol: 5% ammonium hydroxide

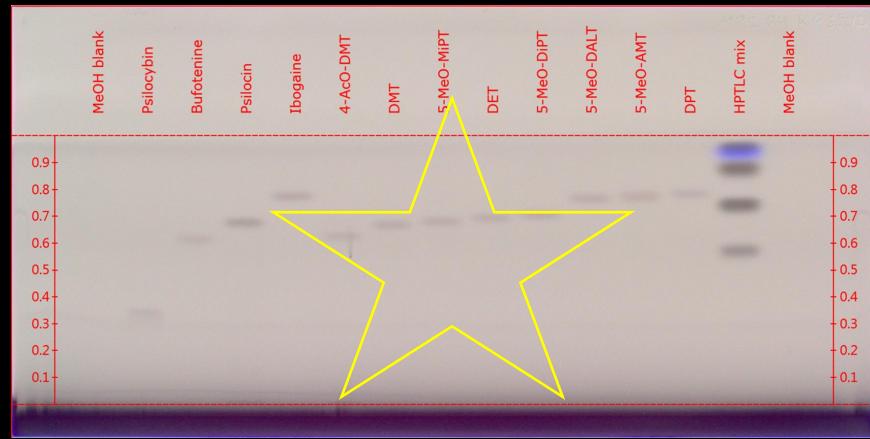


MP 6
75:10:15 methanol: glacial acetic acid: water

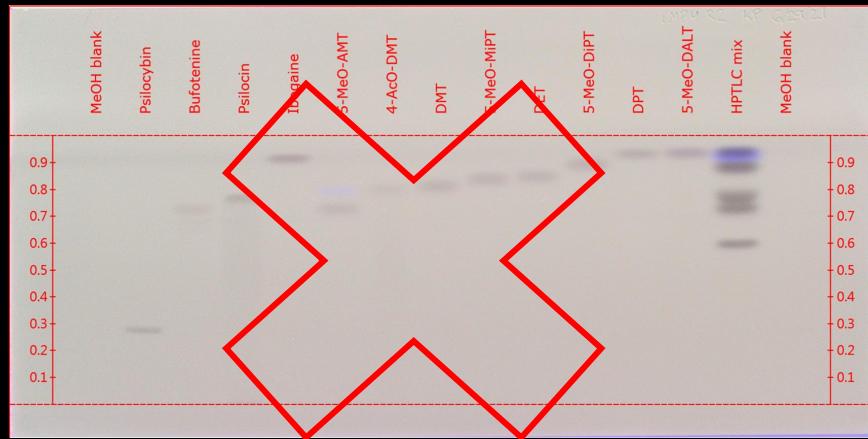




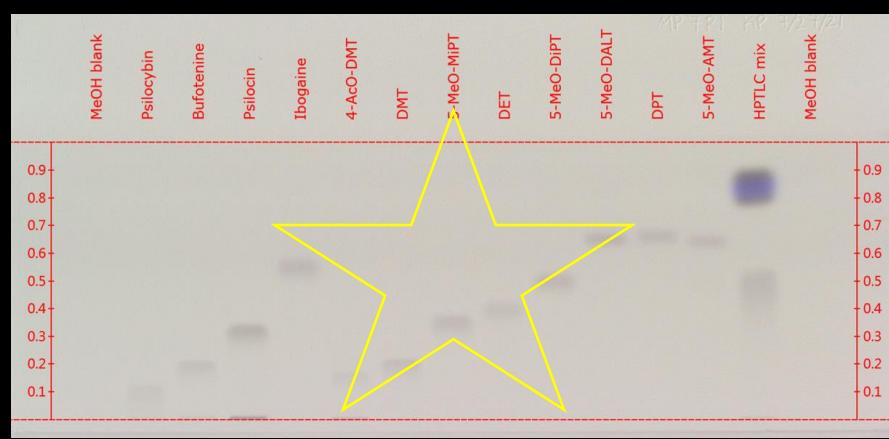
MP 1
100:1.5 methanol: ammonium hydroxide



MP 2
2:1:1 n-butanol: water: glacial acetic acid

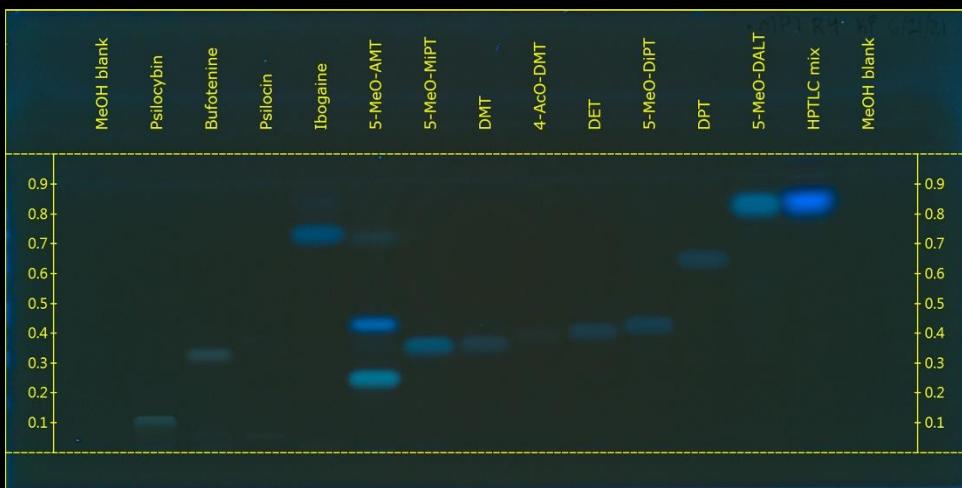
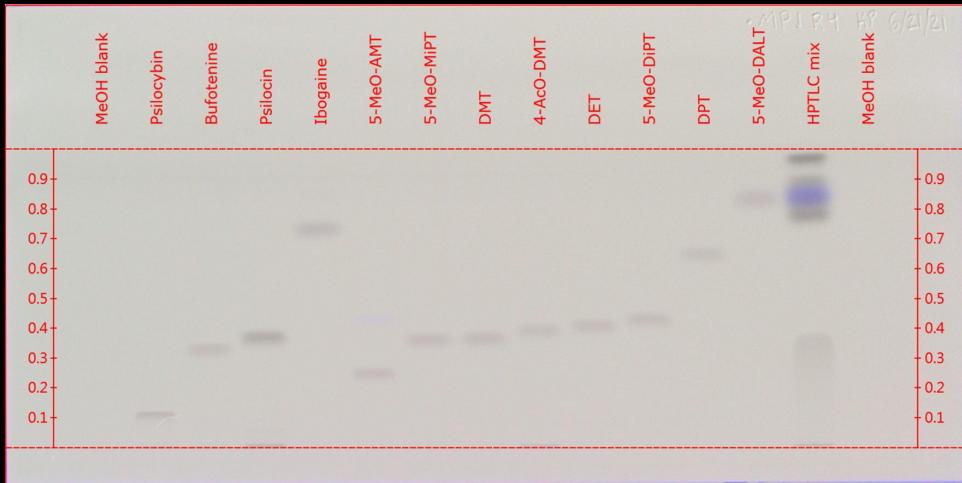


MP 4
2:1 n-propanol: 5% ammonium hydroxide



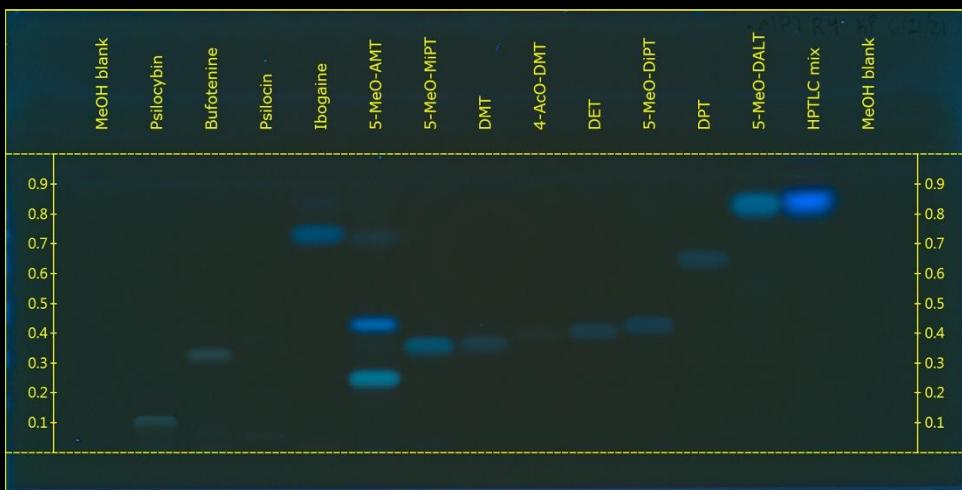
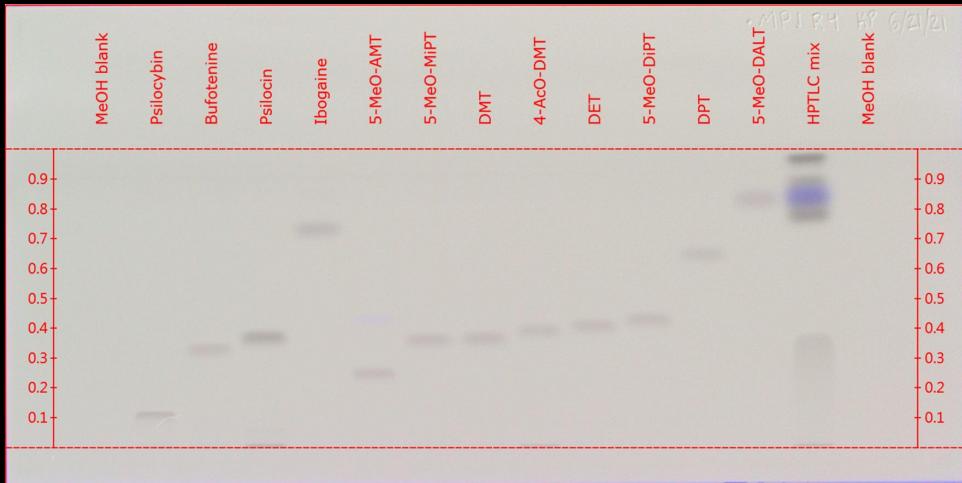
MP 7
100:1.5 methanol: glacial acetic acid

MP #1



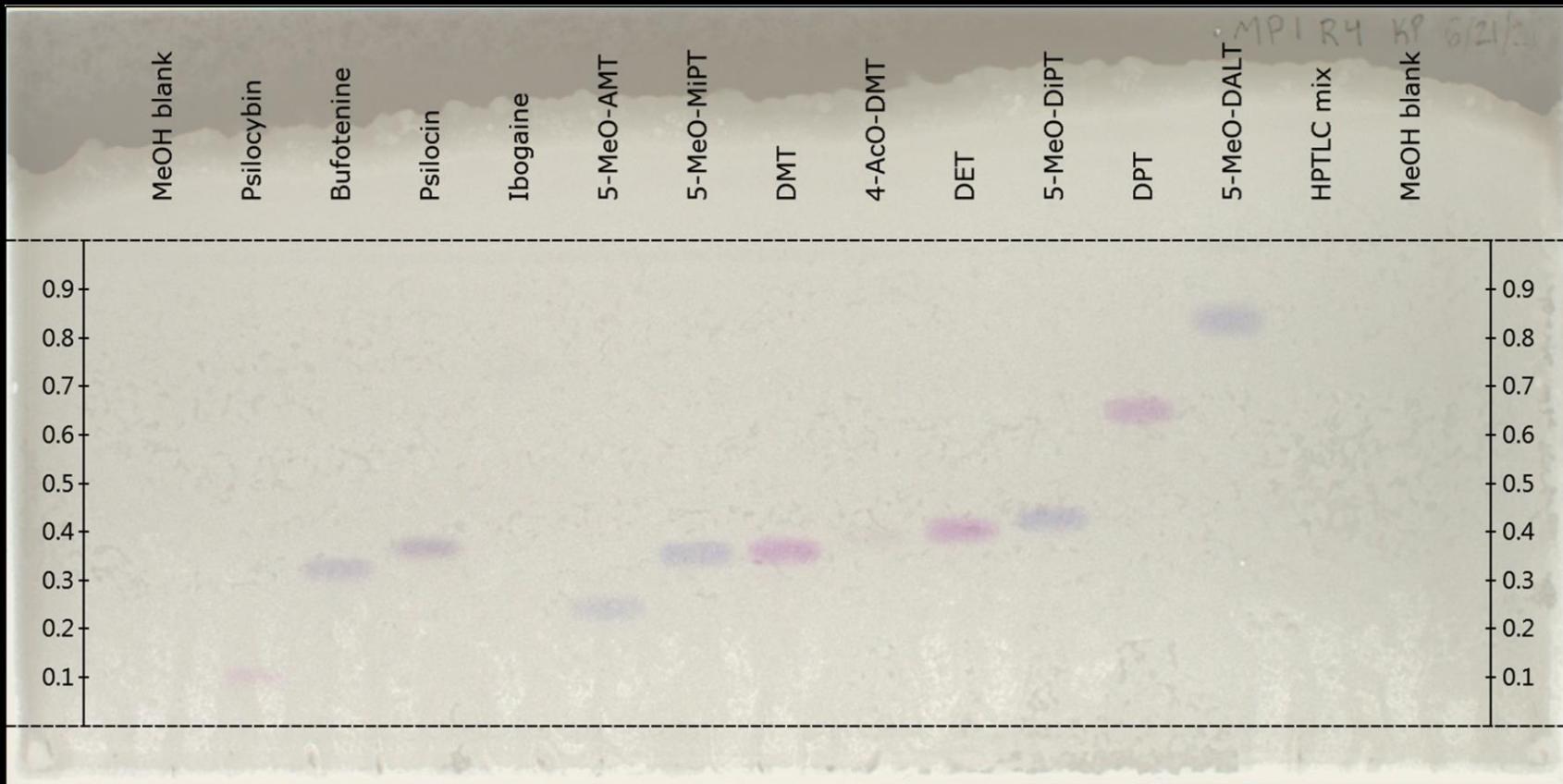
Compound	R _F	Std Dev	CV %	n
Psilocybin	0.098	0.008	8.03	9
5-MeO-AMT	0.179	0.046	25.40	9
Bufotenine	0.251	0.054	21.55	9
5-MeO-MiPT	0.263	0.067	25.36	9
DMT	0.278	0.061	21.83	9
Psilocin	0.282	0.058	20.47	9
4-AcO-DMT	0.301	0.060	20.06	9
DET	0.305	0.071	23.13	9
5-MeO-DiPT	0.312	0.084	26.81	9
DPT	0.554	0.070	12.56	9
Ibogaine	0.664	0.055	8.35	9
5-MeO-DALT	0.801	0.025	3.12	9

MP #1

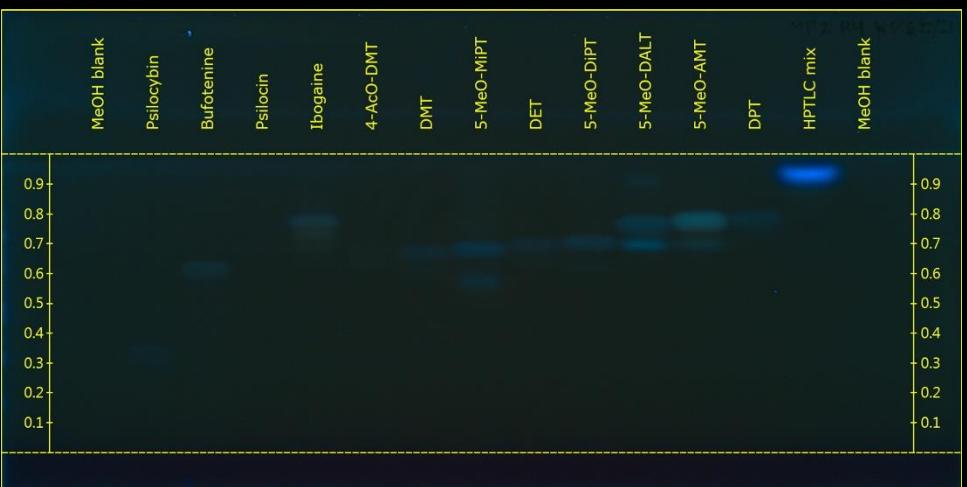


Compound	R _F	Std Dev	CV %	n
Psilocybin	0.098	0.008	8.03	9
5-MeO-AMT	0.179	0.046	25.40	9
Bufotenine	0.251	0.054	21.55	9
5-MeO-MiPT	0.263	0.067	25.36	9
DMT	0.278	0.061	21.83	9
Psilocin	0.282	0.058	20.47	9
4-AcO-DMT	0.301	0.060	20.06	9
DET	0.305	0.071	23.13	9
5-MeO-DiPT	0.312	0.084	26.81	9
DPT	0.554	0.070	12.56	9
Ibogaine	0.664	0.055	8.35	9
5-MeO-DALT	0.801	0.025	3.12	9

MP #1

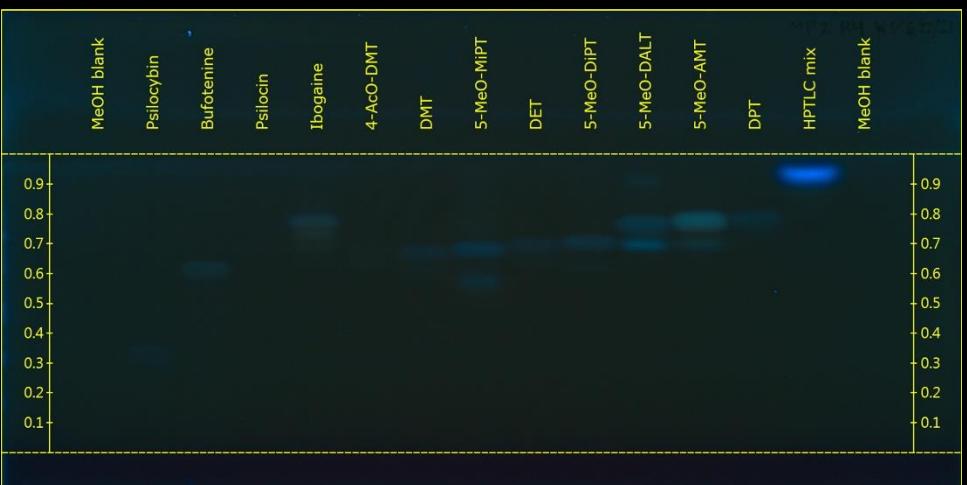


MP #2



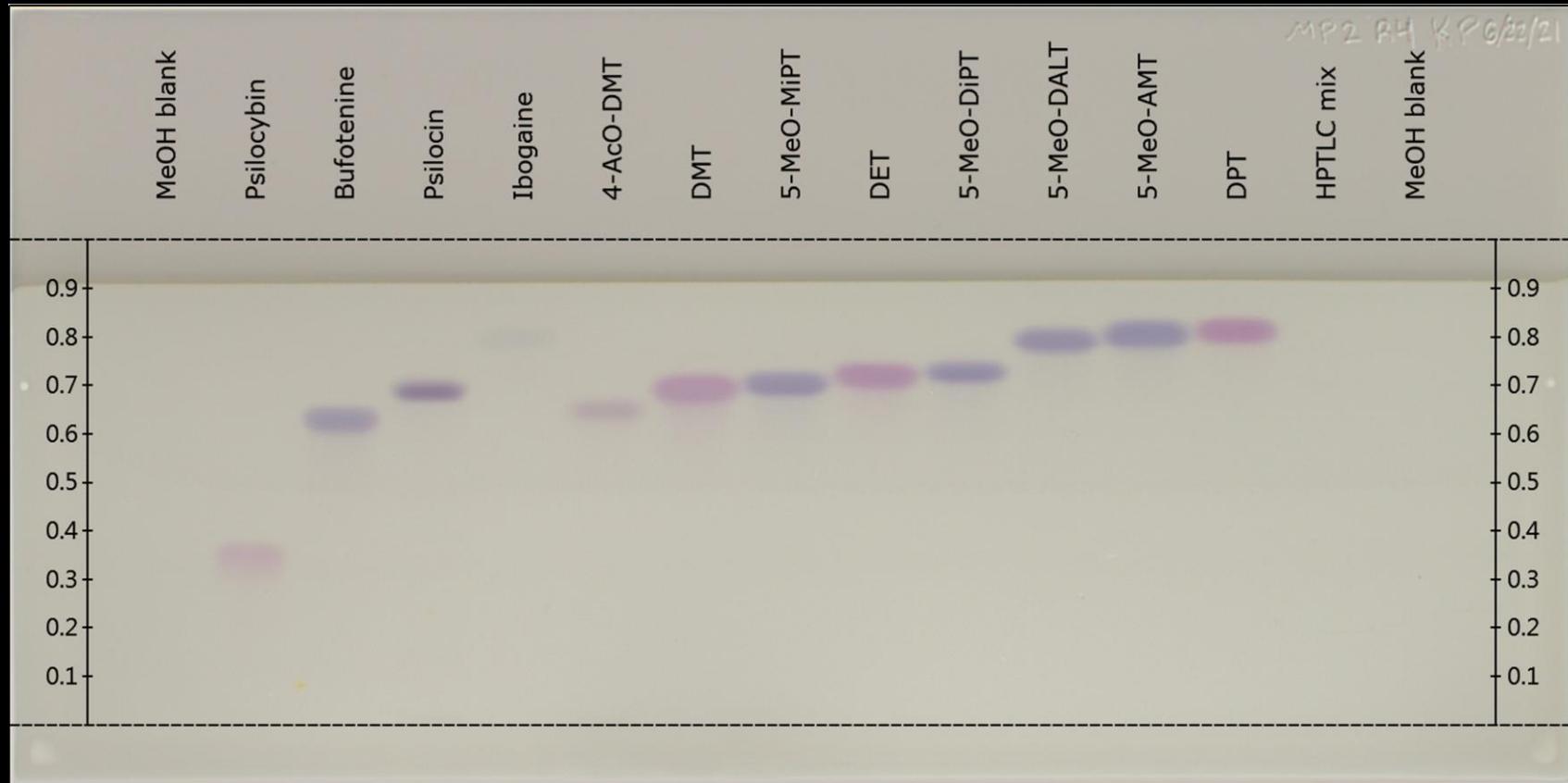
Compound	R _F	Std Dev	CV %	n
Psilocybin	0.309	0.021	6.69	9
Bufotenine	0.579	0.019	3.34	9
4-AcO-DMT	0.585	0.019	3.17	9
DMT	0.633	0.015	2.45	15
Psilocin	0.643	0.017	2.59	9
5-MeO-MiPT	0.647	0.016	2.44	15
DET	0.664	0.013	2.01	15
5-MeO-DiPT	0.675	0.014	2.02	15
5-MeO-DALT	0.748	0.013	1.70	15
Ibogaine	0.749	0.012	1.57	15
5-MeO-AMT	0.758	0.008	1.10	15
DPT	0.763	0.010	1.28	15

MP #2

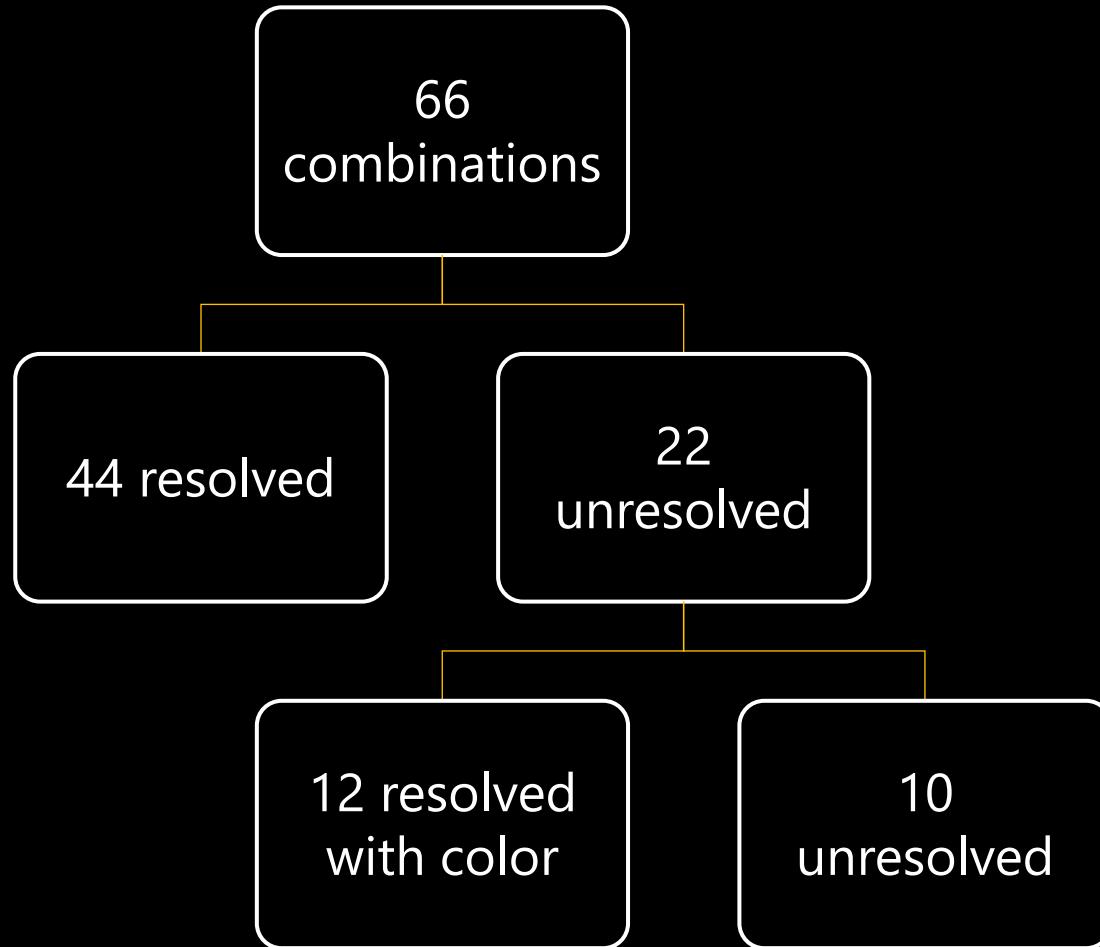


Compound	R _F	Std Dev	CV %	n
Psilocybin	0.309	0.021	6.69	9
Bufotenine	0.579	0.019	3.34	9
4-AcO-DMT	0.585	0.019	3.17	9
DMT	0.633	0.015	2.45	15
Psilocin	0.643	0.017	2.59	9
5-MeO-MiPT	0.647	0.016	2.44	15
DET	0.664	0.013	2.01	15
5-MeO-DiPT	0.675	0.014	2.02	15
5-MeO-DALT	0.748	0.013	1.70	15
Ibogaine	0.749	0.012	1.57	15
5-MeO-AMT	0.758	0.008	1.10	15
DPT	0.763	0.010	1.28	15

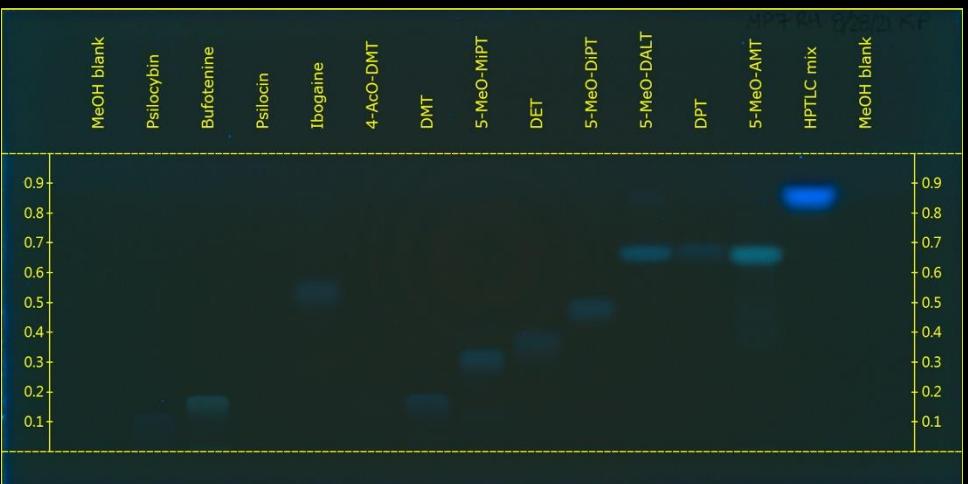
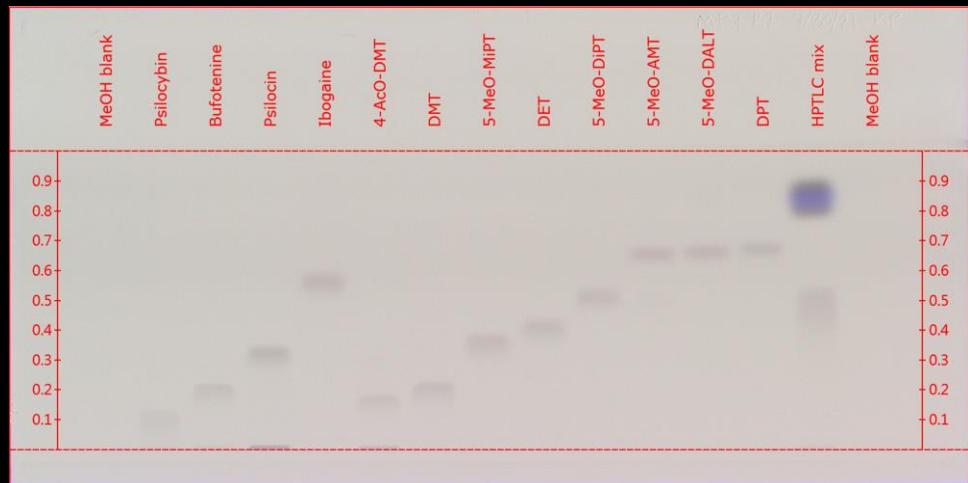
MP #2



Resolution of MP #2

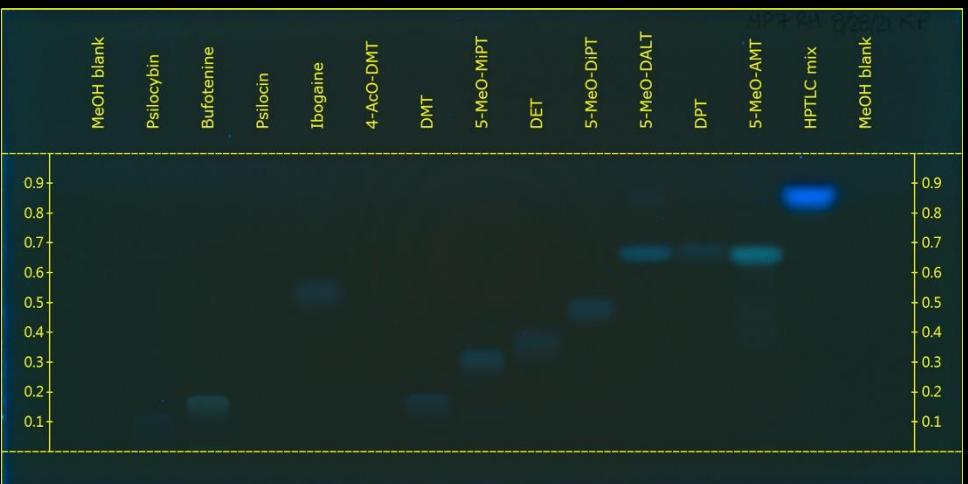
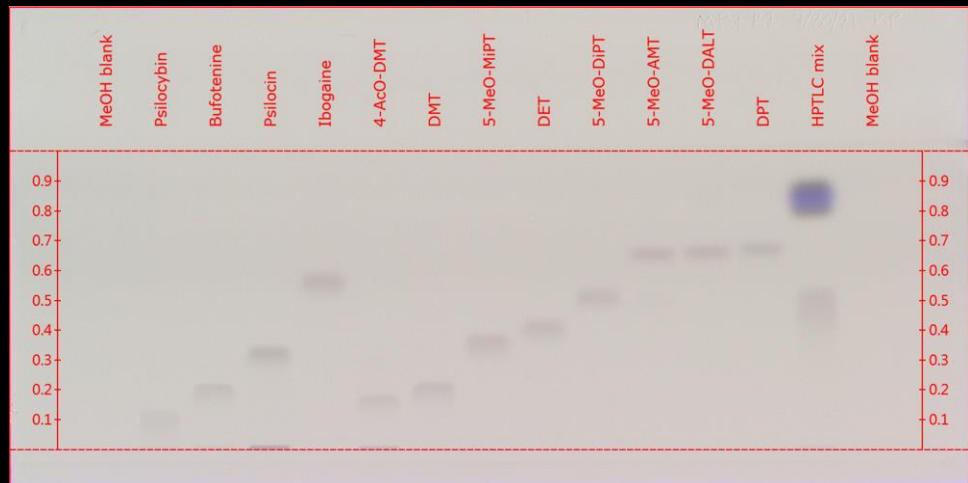


MP #7



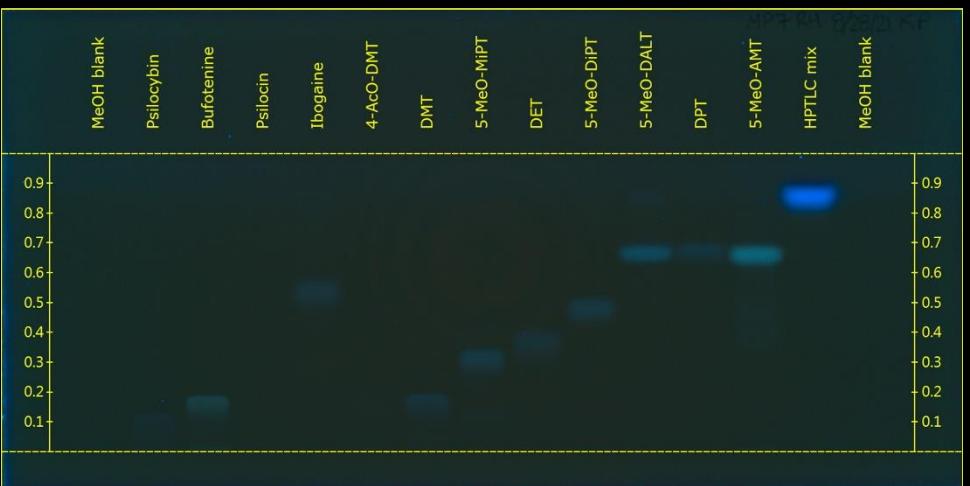
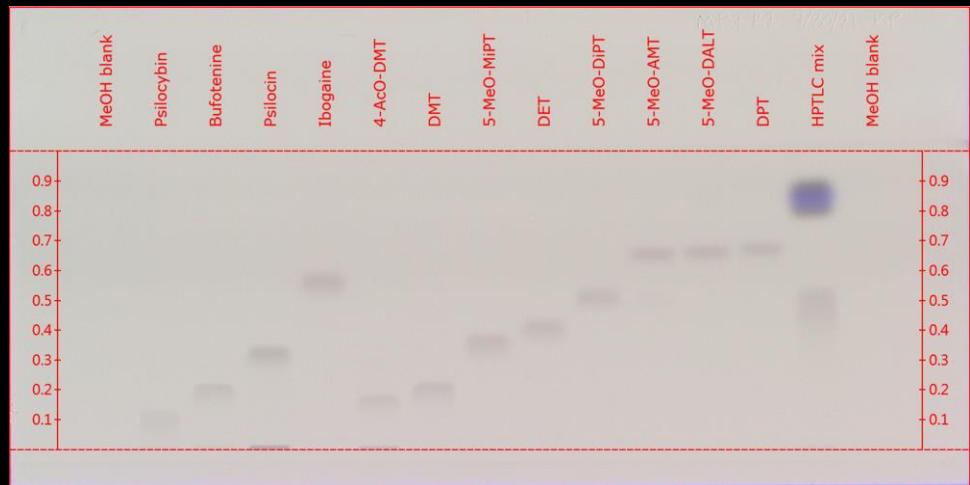
Compound	R _F	Std Dev	CV %	n
Psilocybin	0.101	0.009	8.97	9
4-AcO-DMT	0.138	0.016	11.51	9
Bufotenine	0.173	0.018	10.48	9
DMT	0.183	0.017	9.15	9
Psilocin	0.300	0.015	5.13	9
5-MeO-MiPT	0.326	0.021	6.30	9
DET	0.380	0.014	3.64	9
5-MeO-DiPT	0.482	0.012	2.56	15
Ibogaine	0.538	0.013	2.40	9
5-MeO-AMT	0.656	0.010	1.53	9
5-MeO-DALT	0.662	0.008	1.19	15
DPT	0.672	0.007	1.08	15

MP #7



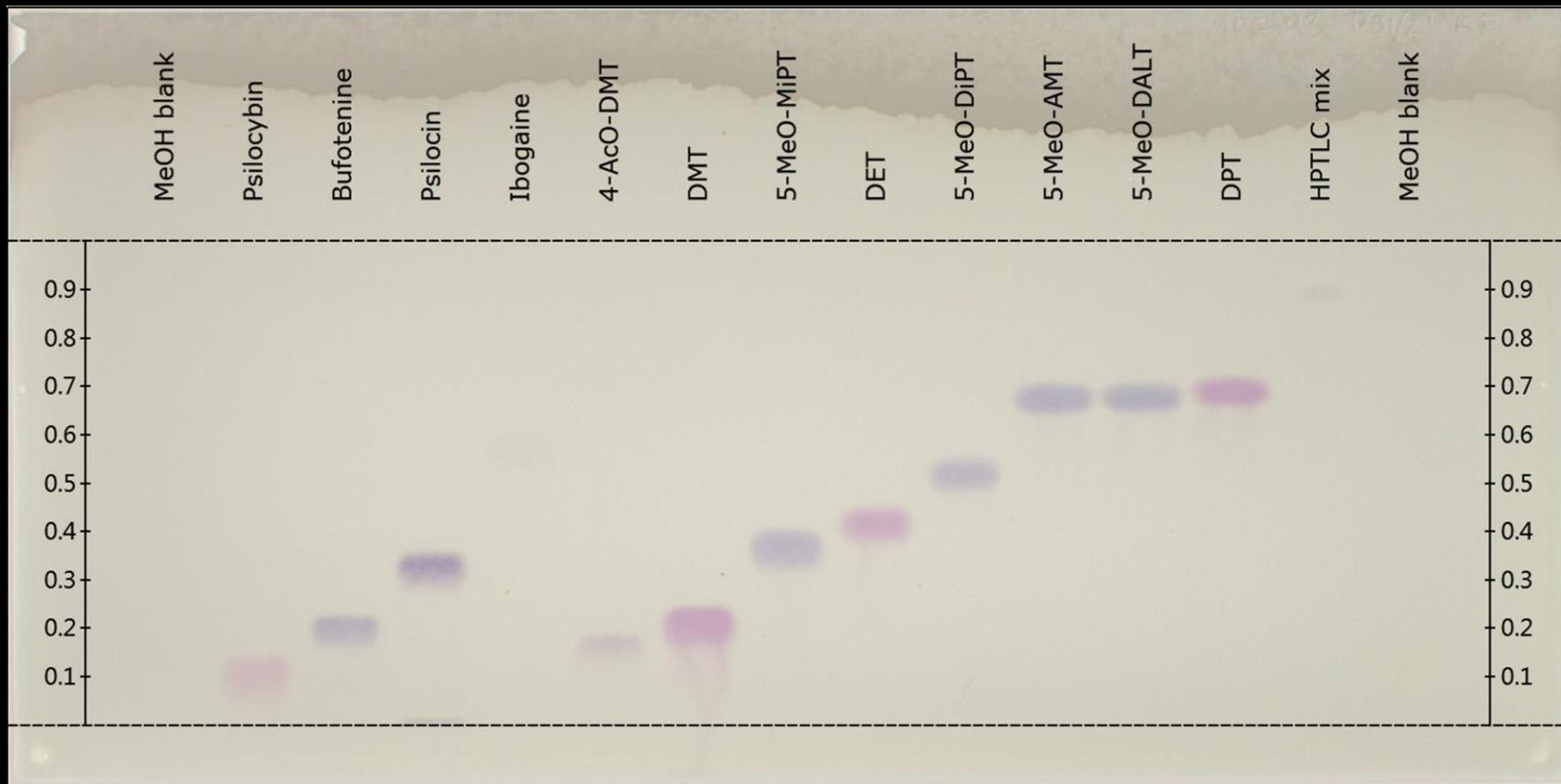
Compound	R _F	Std Dev	CV %	n
Psilocybin	0.101	0.009	8.97	9
4-AcO-DMT	0.138	0.016	11.51	9
Bufotenine	0.173	0.018	10.48	9
DMT	0.183	0.017	9.15	9
Psilocin	0.300	0.015	5.13	9
5-MeO-MiPT	0.326	0.021	6.30	9
DET	0.380	0.014	3.64	9
5-MeO-DiPT	0.482	0.012	2.56	15
Ibogaine	0.538	0.013	2.40	9
5-MeO-AMT	0.656	0.010	1.53	9
5-MeO-DALT	0.662	0.008	1.19	15
DPT	0.672	0.007	1.08	15

MP #7

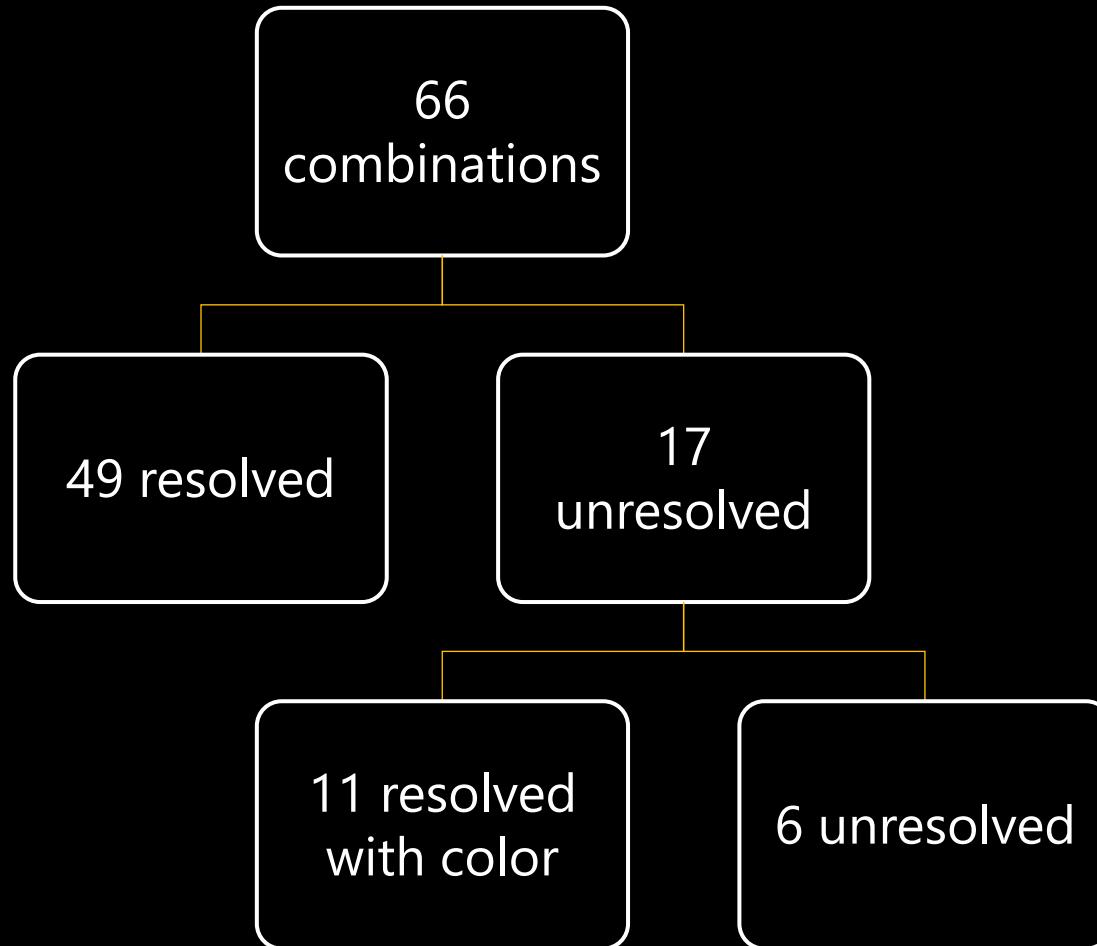


Compound	R _F	Std Dev	CV %	n
Psilocybin	0.101	0.009	8.97	9
4-AcO-DMT	0.138	0.016	11.51	9
Bufotenine	0.173	0.018	10.48	9
DMT	0.183	0.017	9.15	9
Psilocin	0.300	0.015	5.13	9
5-MeO-MiPT	0.326	0.021	6.30	9
DET	0.380	0.014	3.64	9
5-MeO-DiPT	0.482	0.012	2.56	15
Ibogaine	0.538	0.013	2.40	9
5-MeO-AMT	0.656	0.010	1.53	9
5-MeO-DALT	0.662	0.008	1.19	15
DPT	0.672	0.007	1.08	15

MP #7



Resolution of MP #7



Unresolved Compounds

Mobile Phase #2	Mobile Phase #7
5-MeO-DALT vs 5-MeO-AMT	
4-AcO-DMT vs Bufotenine	
Psilocin vs 5-MeO-MiPT	
DMT vs 4-AcO-DMT	
DMT vs DET	DMT vs Psilocybin
Psilocin vs 4-AcO-DMT	4-AcO-DMT vs Psilocybin
Psilocin vs 5-MeO-DiPT	
5-MeO-MiPT vs Bufotenine	
Psilocin vs Bufotenine	
5-MeO-DiPT vs 5-MeO-MiPT	

Conclusions

- Mobile phases
- Visualization reagent
- HPTLC

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CAMAG

Cedar Crest College



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Questions?

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