HPTLC

Qualitative applications

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CAMAG Laboratory

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Fields of interest

- Food
  - Sweeteners
  - Colors
  - Lipids
  - Spices
- Environmental
  - PAH
  - Bio-Detection
- Botanicals
  - 10 ID methods
  - Adulteration
  - Stability tests
- Cosmetics
  - Skin lipids

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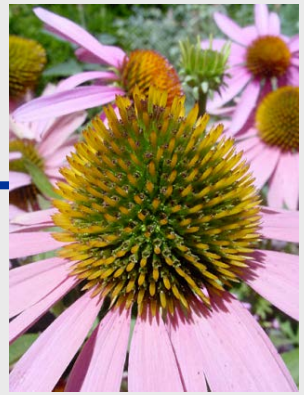
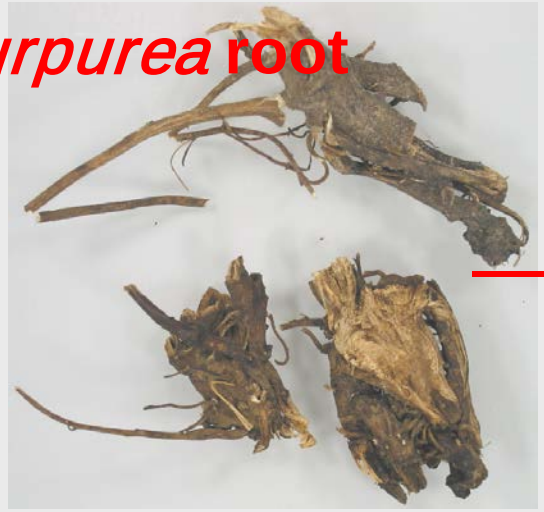
Identification - Echinacea species

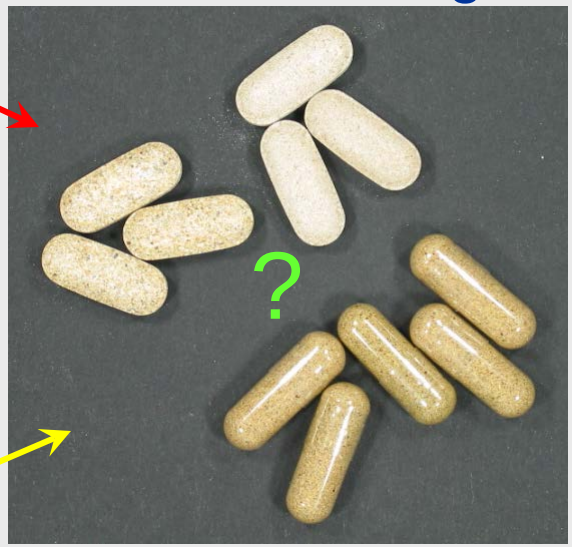


E. purpurea root



Root powder

Botanical drugs



E. angustifolia root

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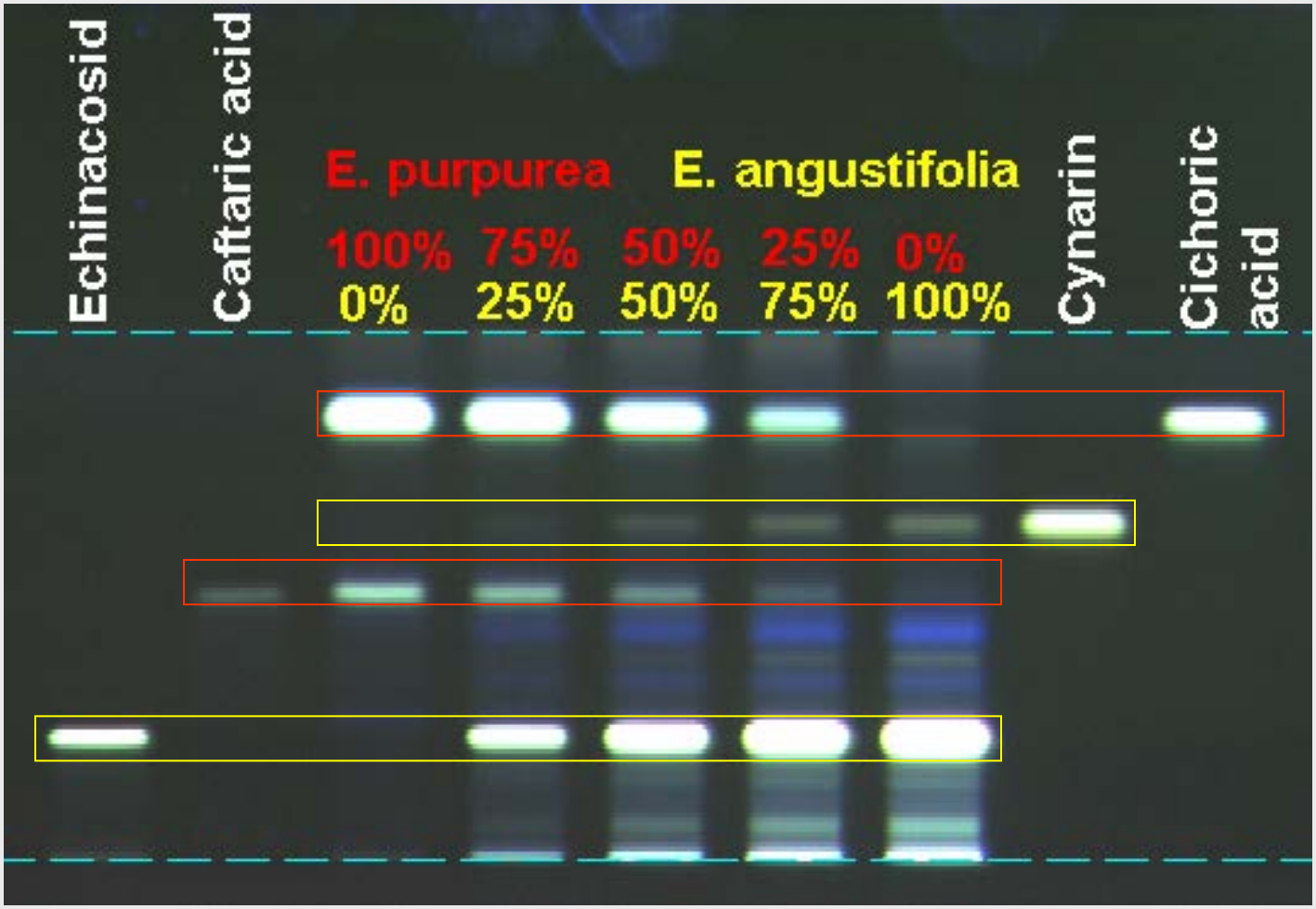
Echinacea - Identification of raw material



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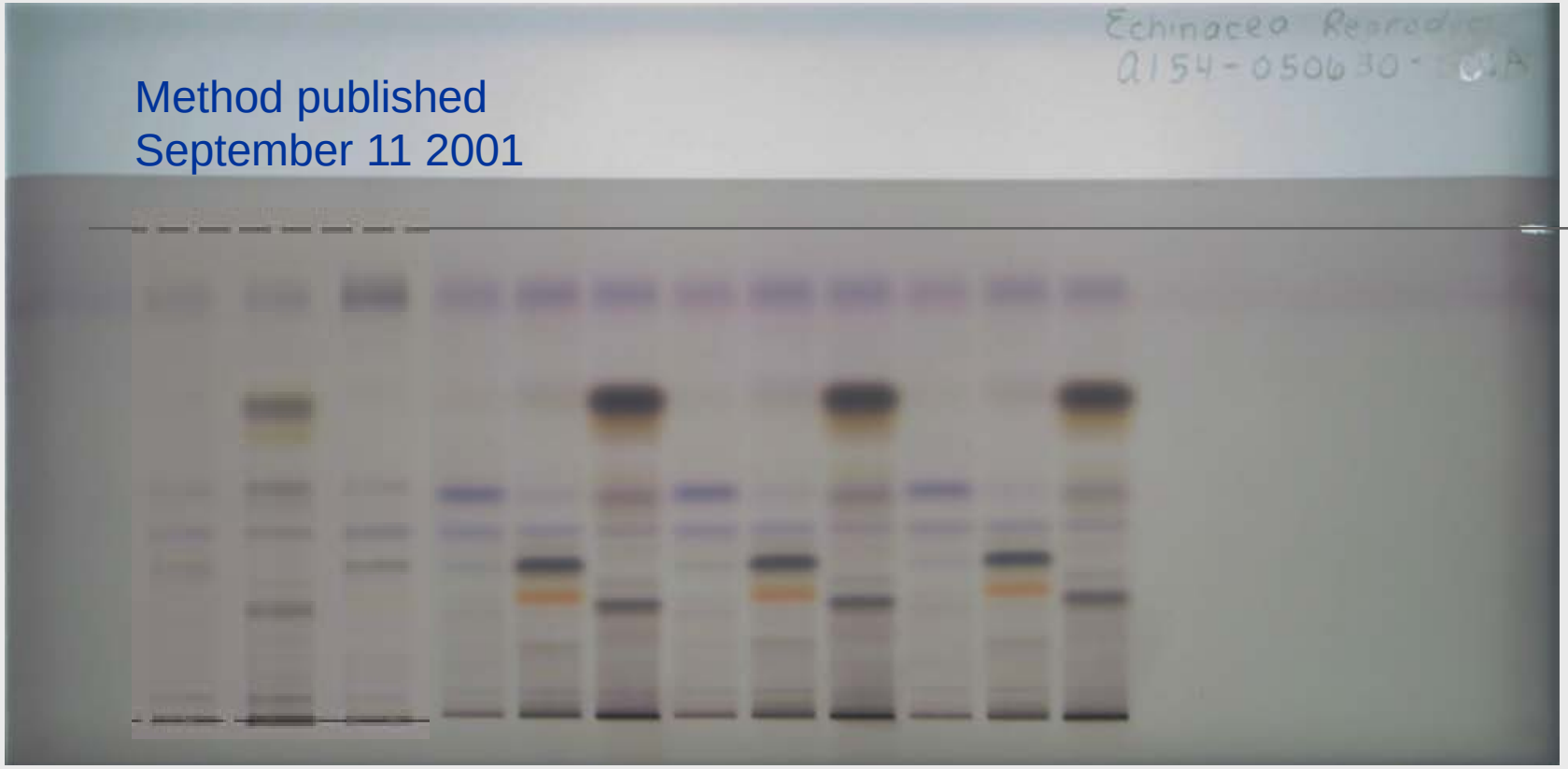
Successful standardization – *Echinacea*

May 06, 2005 – CSI Laboratory



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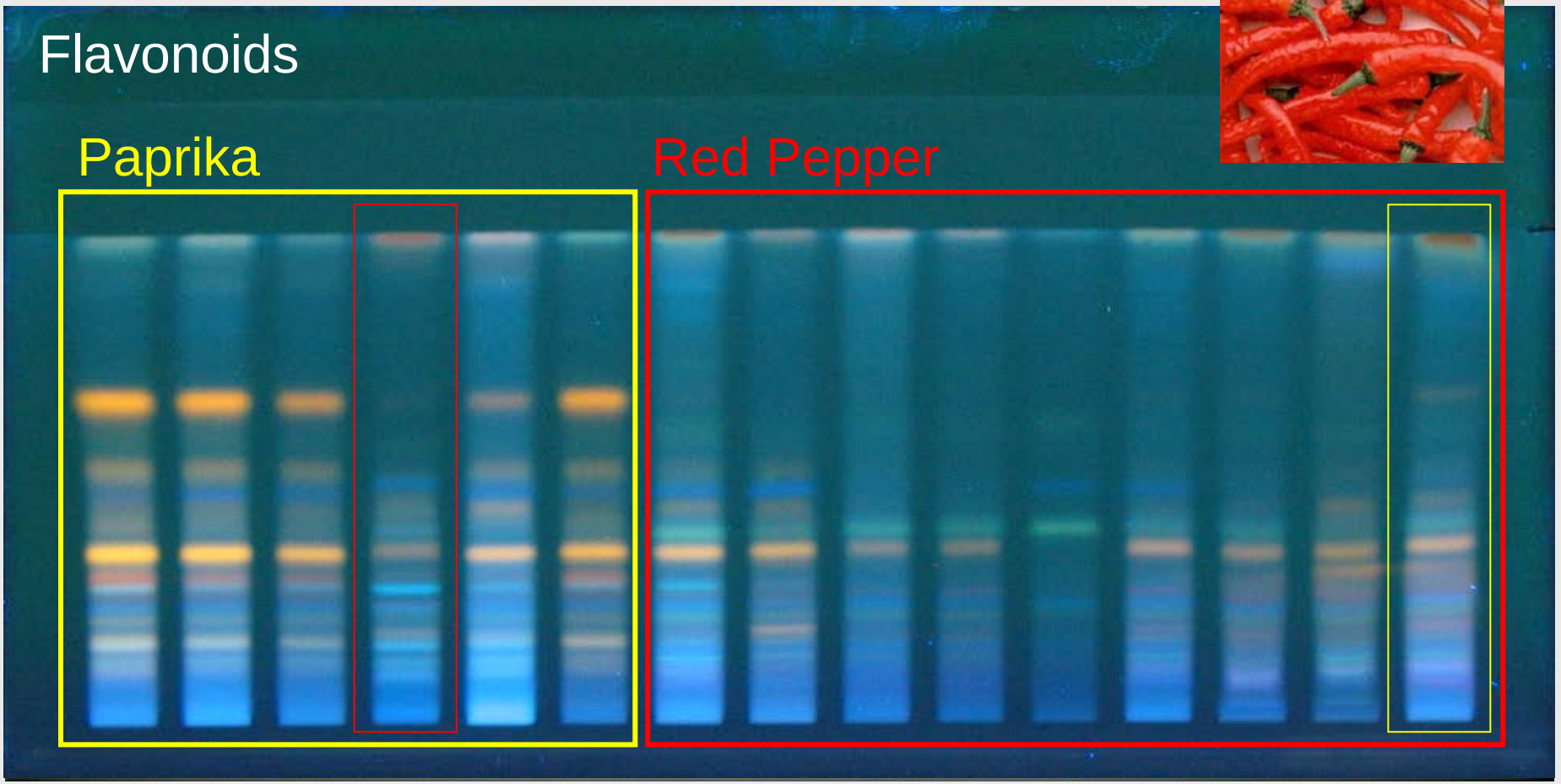
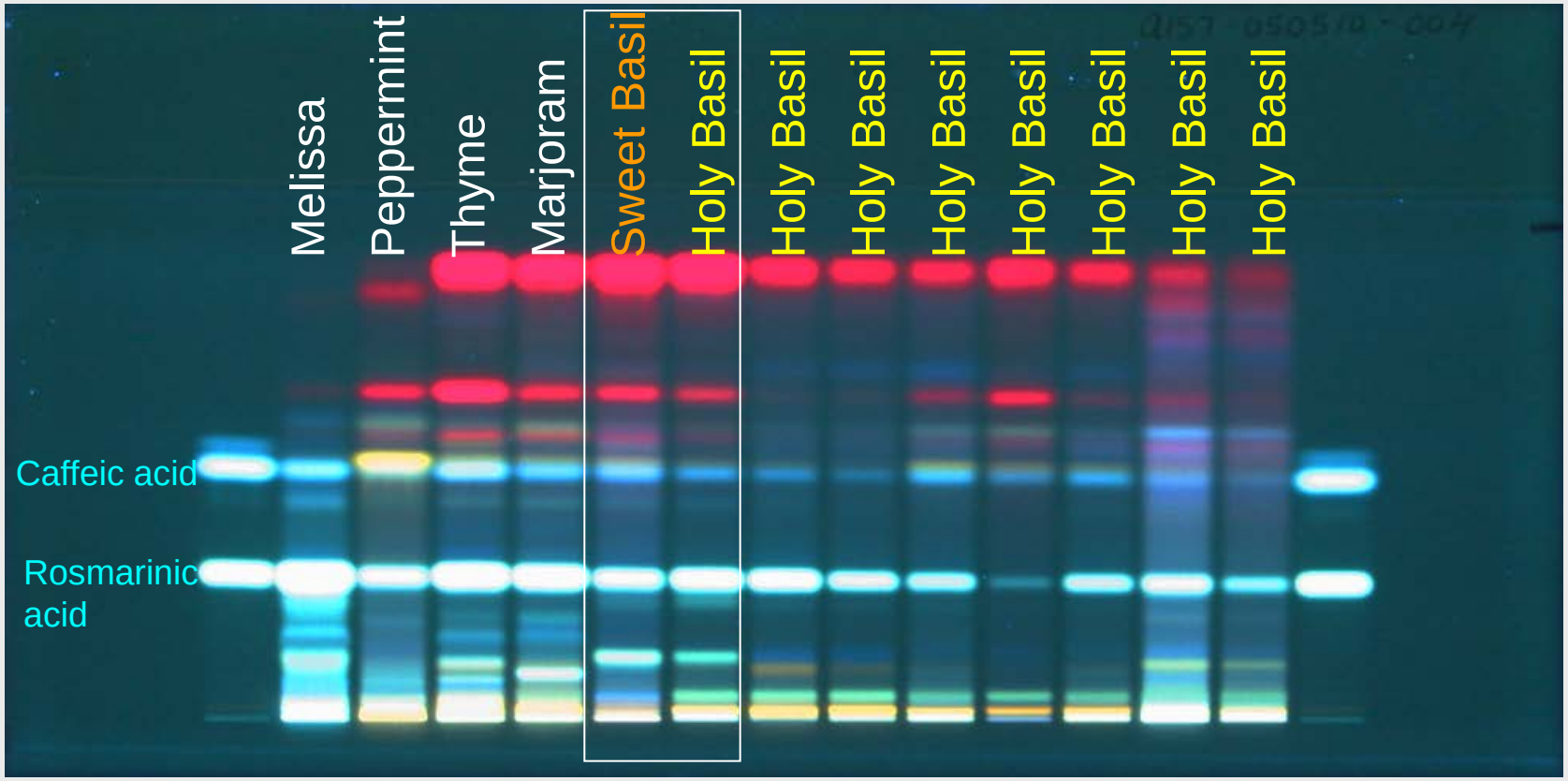
Differentiation of Red Pepper and Paprika



Meaningful fingerprint? No!



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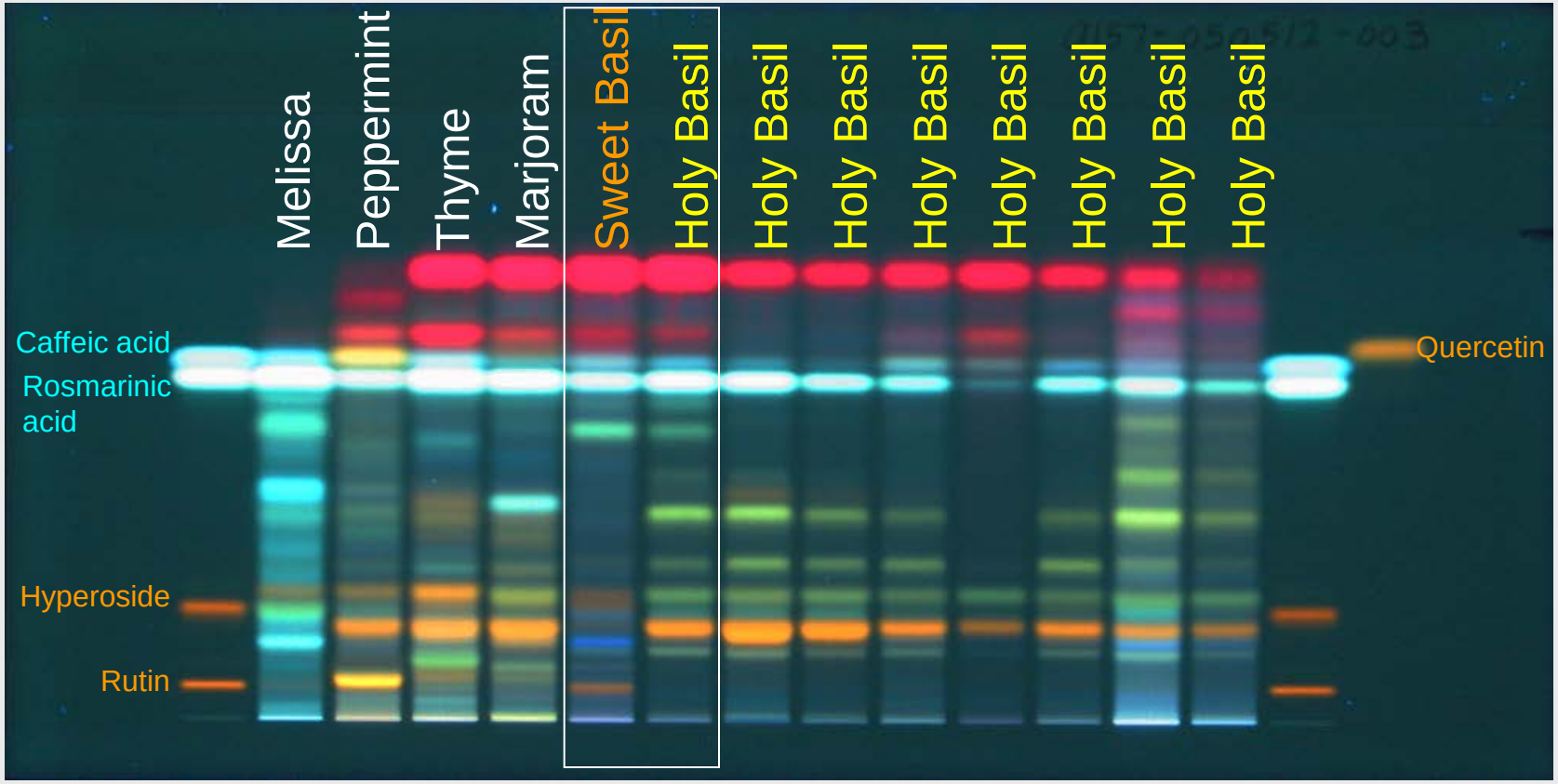
Meaningful fingerprint? YES!



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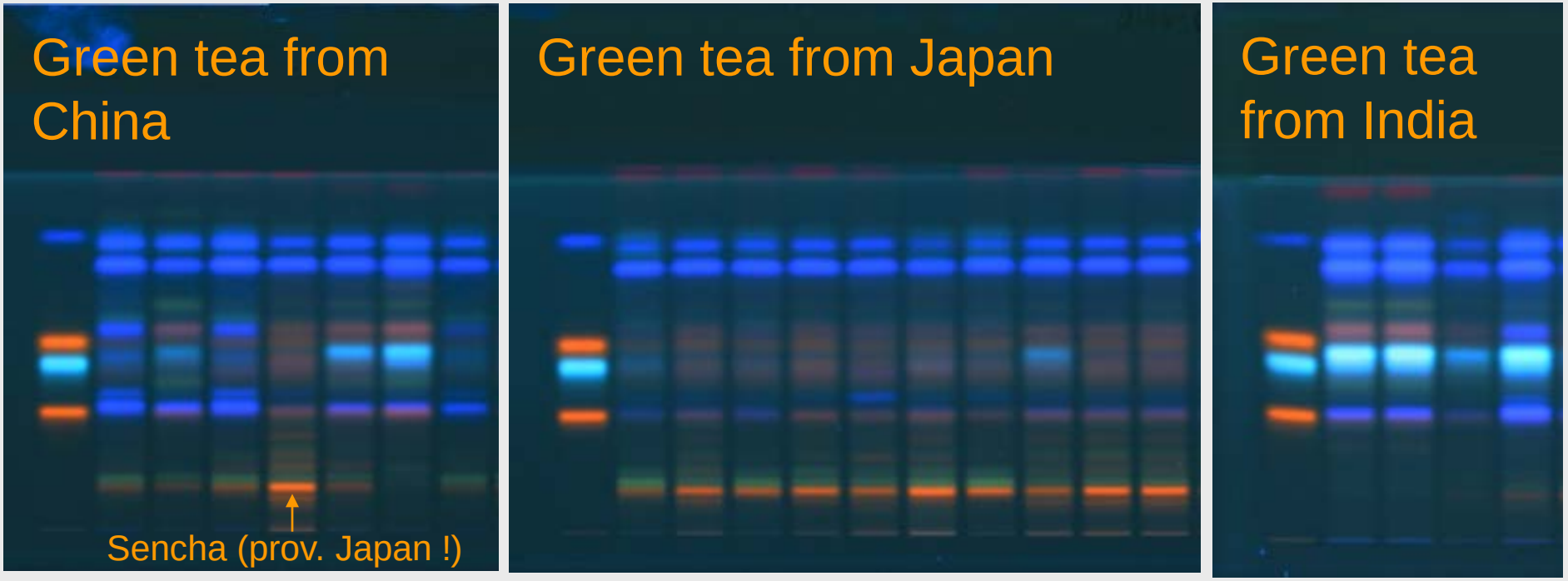
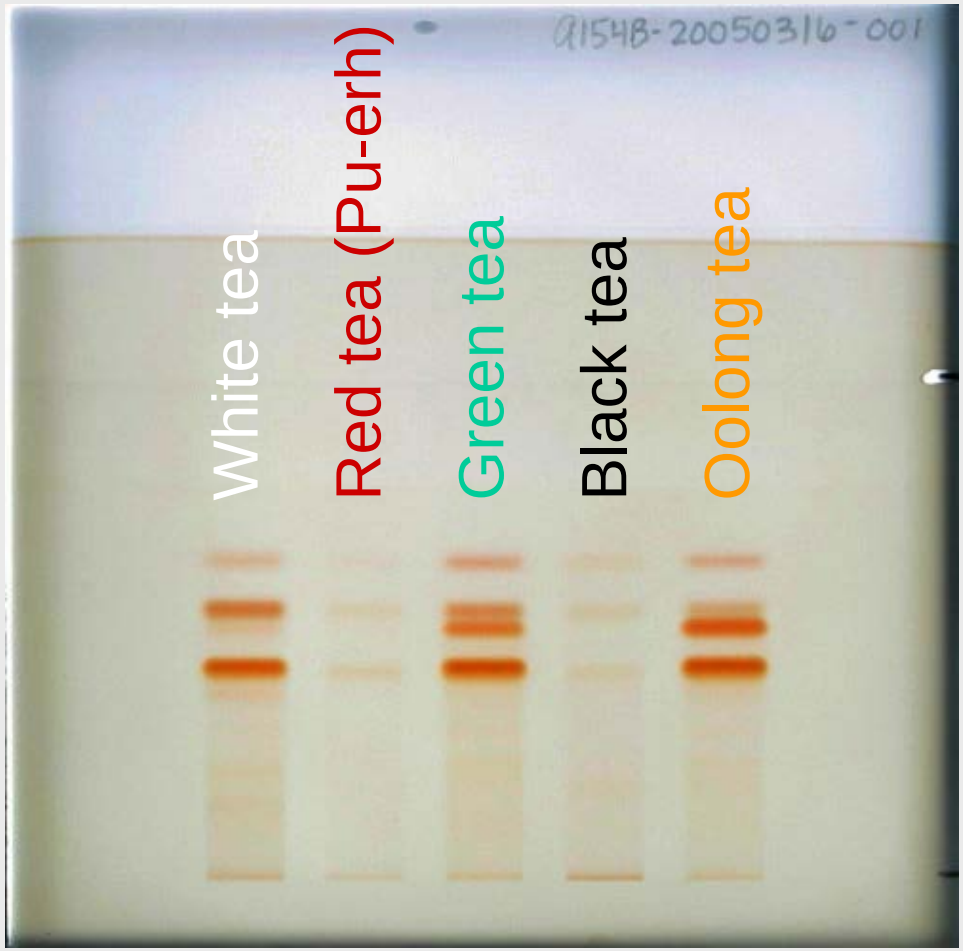
Green tea???



Green tea???



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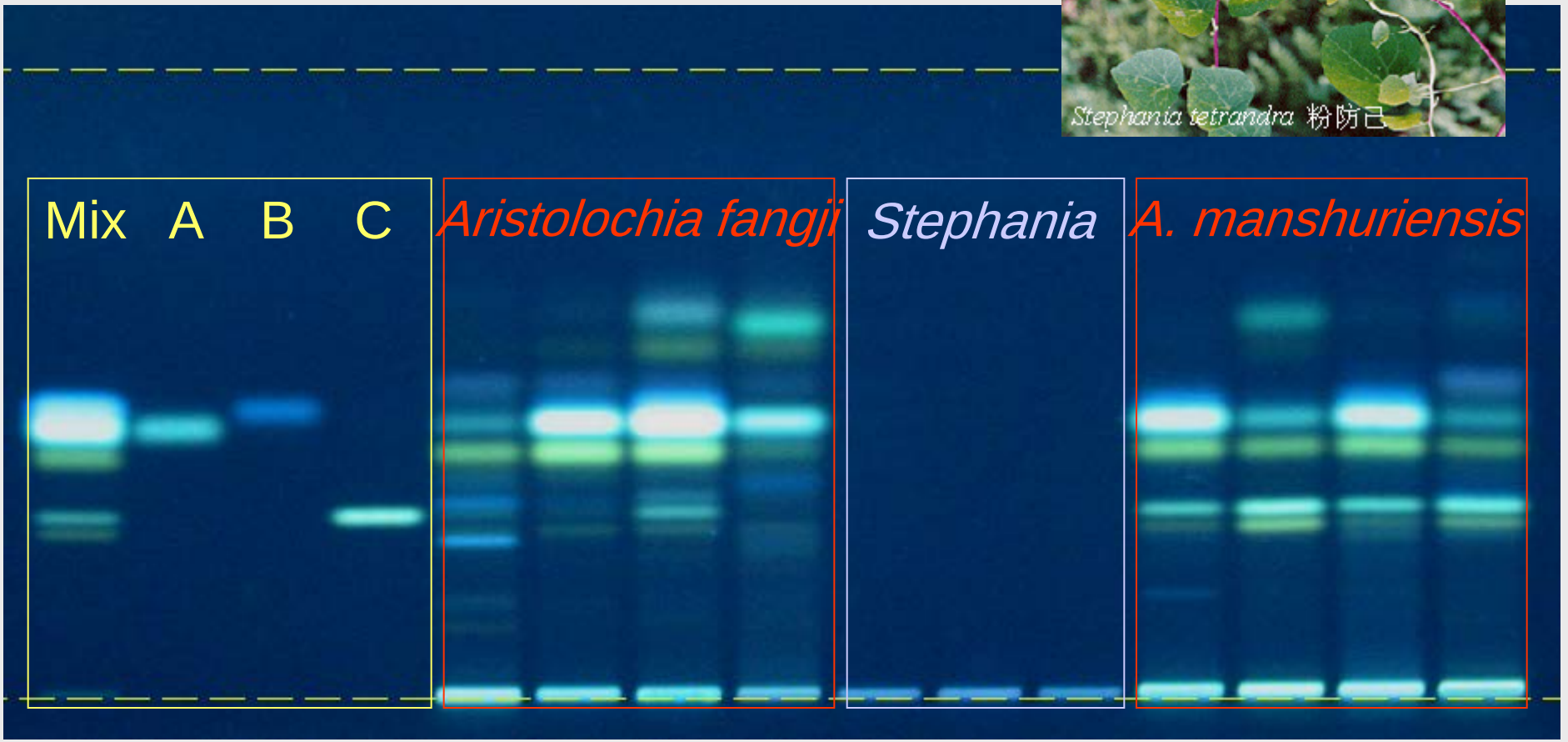
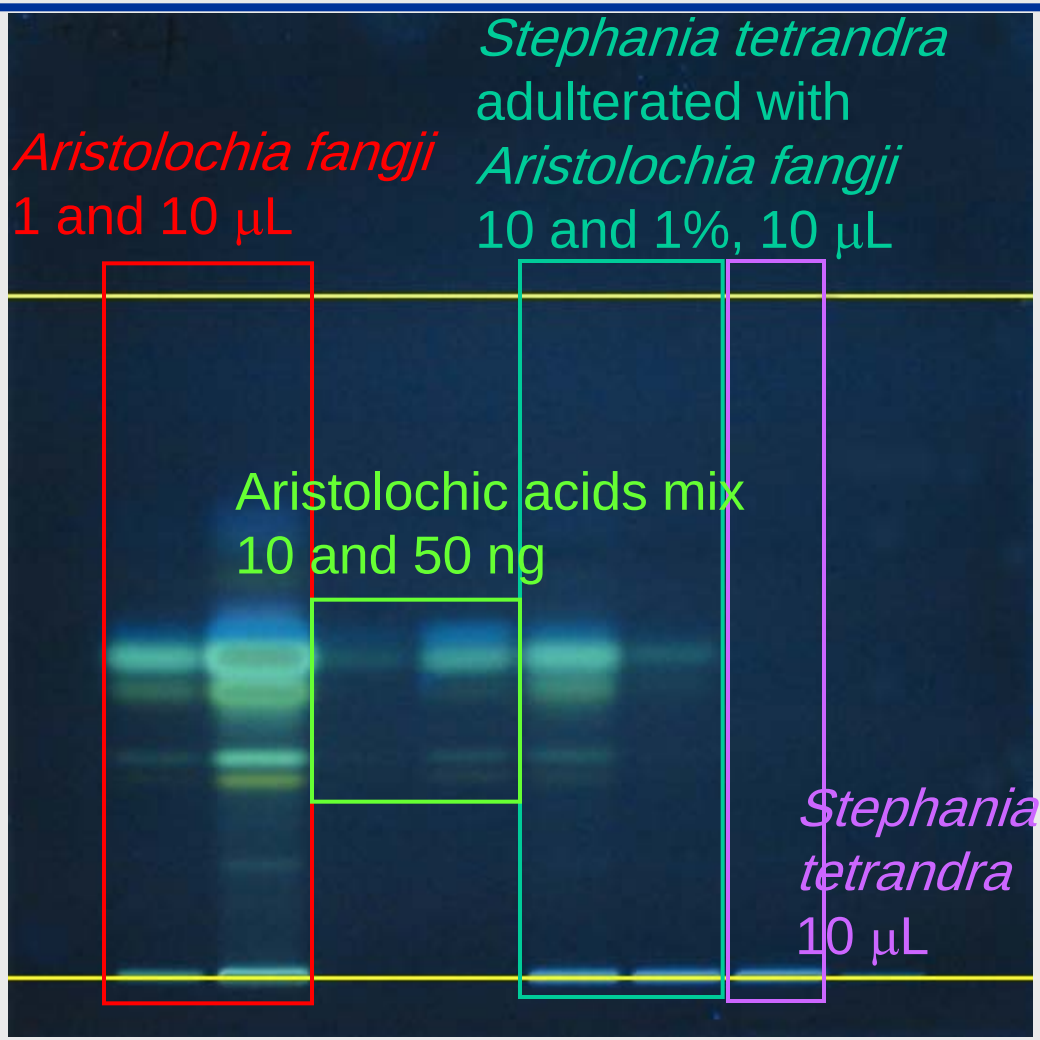
Chinese plants associated with Aristolochic acids

Guang fangji, Fangji, Han fangji, Fen fangji, Mu fangji	*Aristolochia fangji, Stephania tetrandra, Cocculus sp.*
Guan mutong, Mutong, Bei mutong, Chuan mutong, Xiao mutong	*Aristolochia manshuriensis, Akebia trifoliata, Clematis armandi*
Qing muxiang, Muxiang, Guang muxiang, Chuan muxiang	*Aristolochia debilis, Saussurea costus (Aucklandia lappa), Vladimiria soulei*
Xixin, Liao xixin, Bei xixin, Hua xixin	*Asarum heterotropoides, Asarum sieboldii*

Aristolochic acids as markers of toxic plants in TCM



Detection of mixtures



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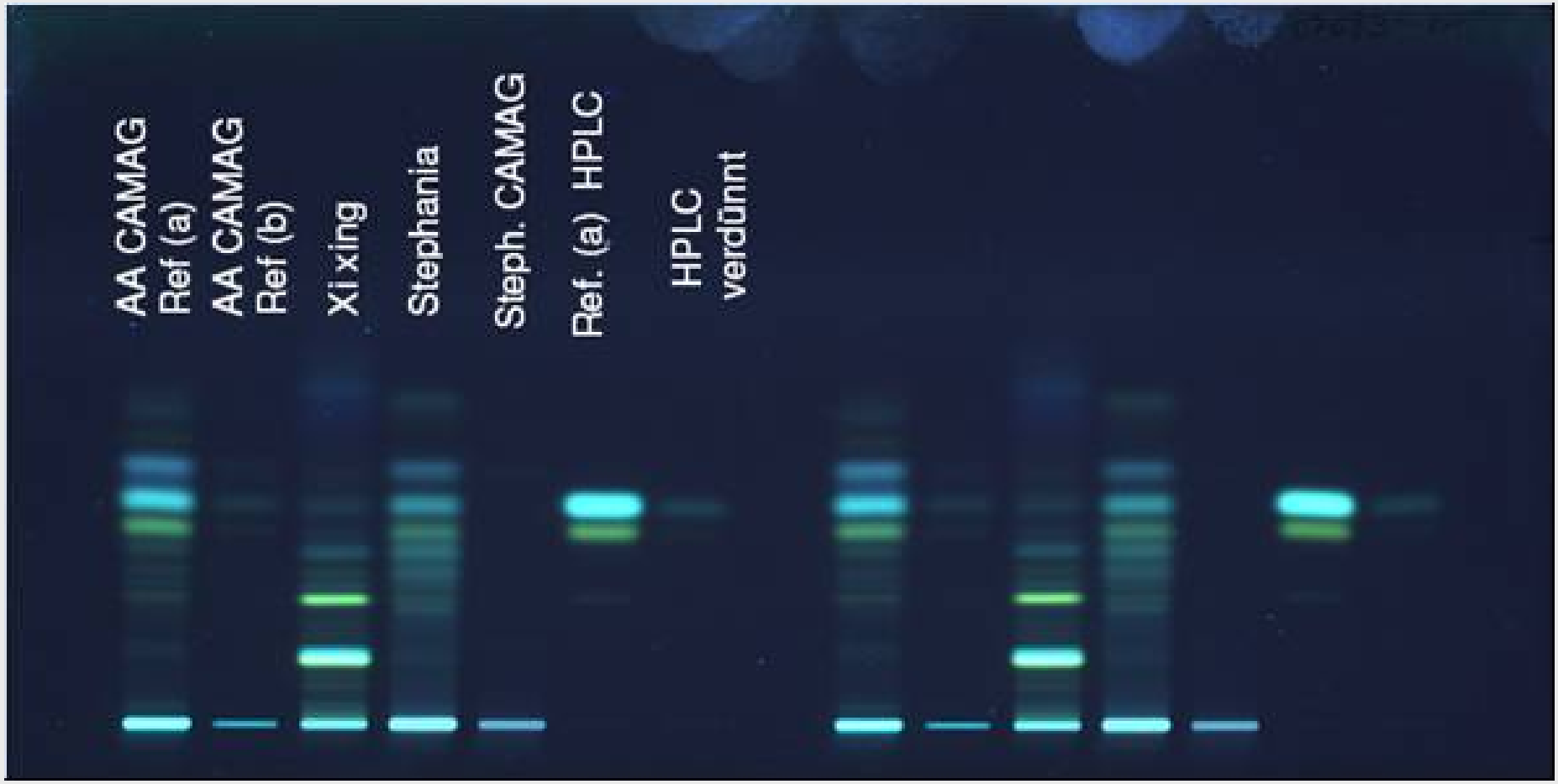
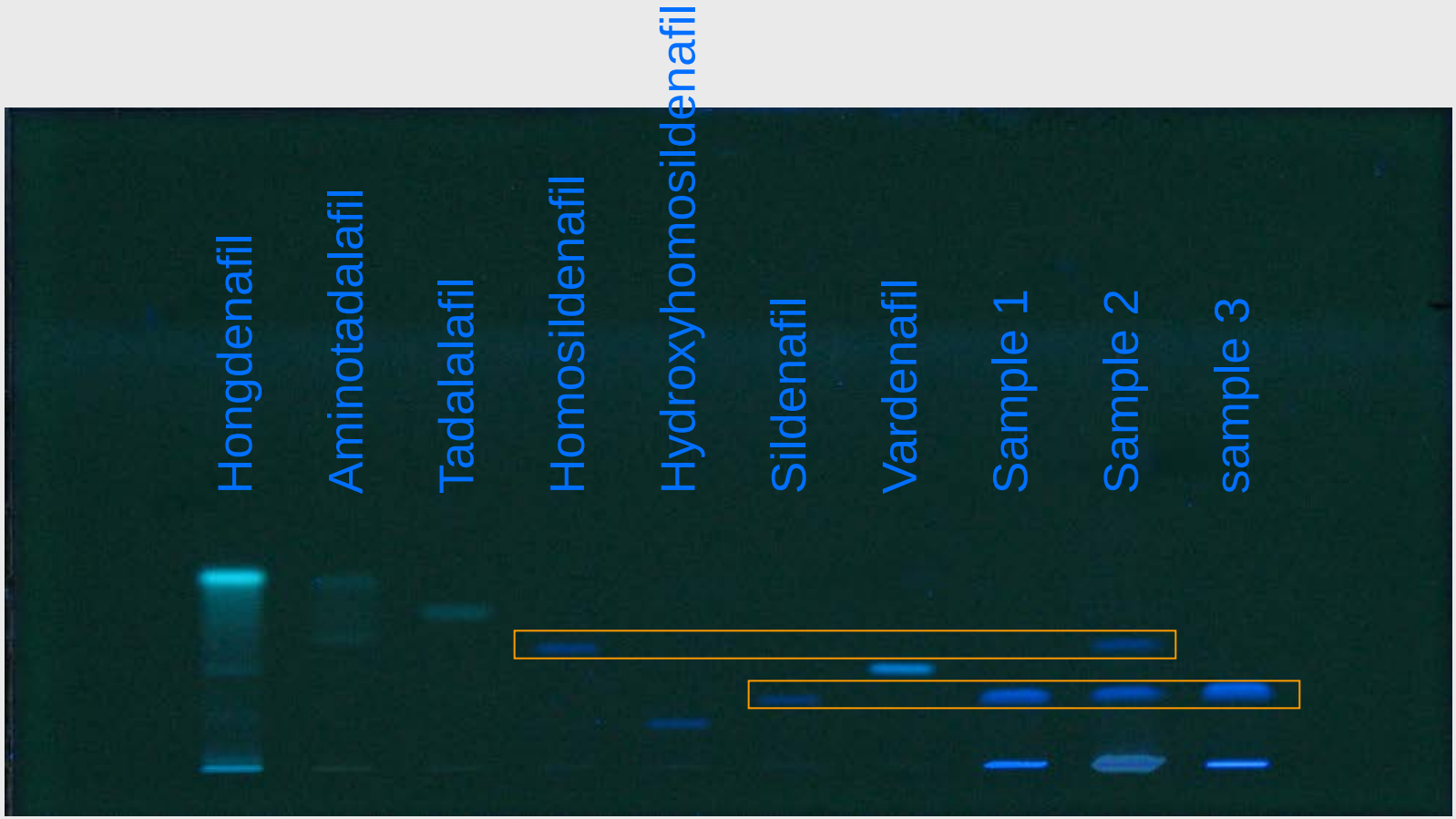
Now to become official test for Ph.Eur.



Synthetic drugs in TCM: Erectile Dysfunction



TBME, MeOH, Ammoniak (20:2:1)

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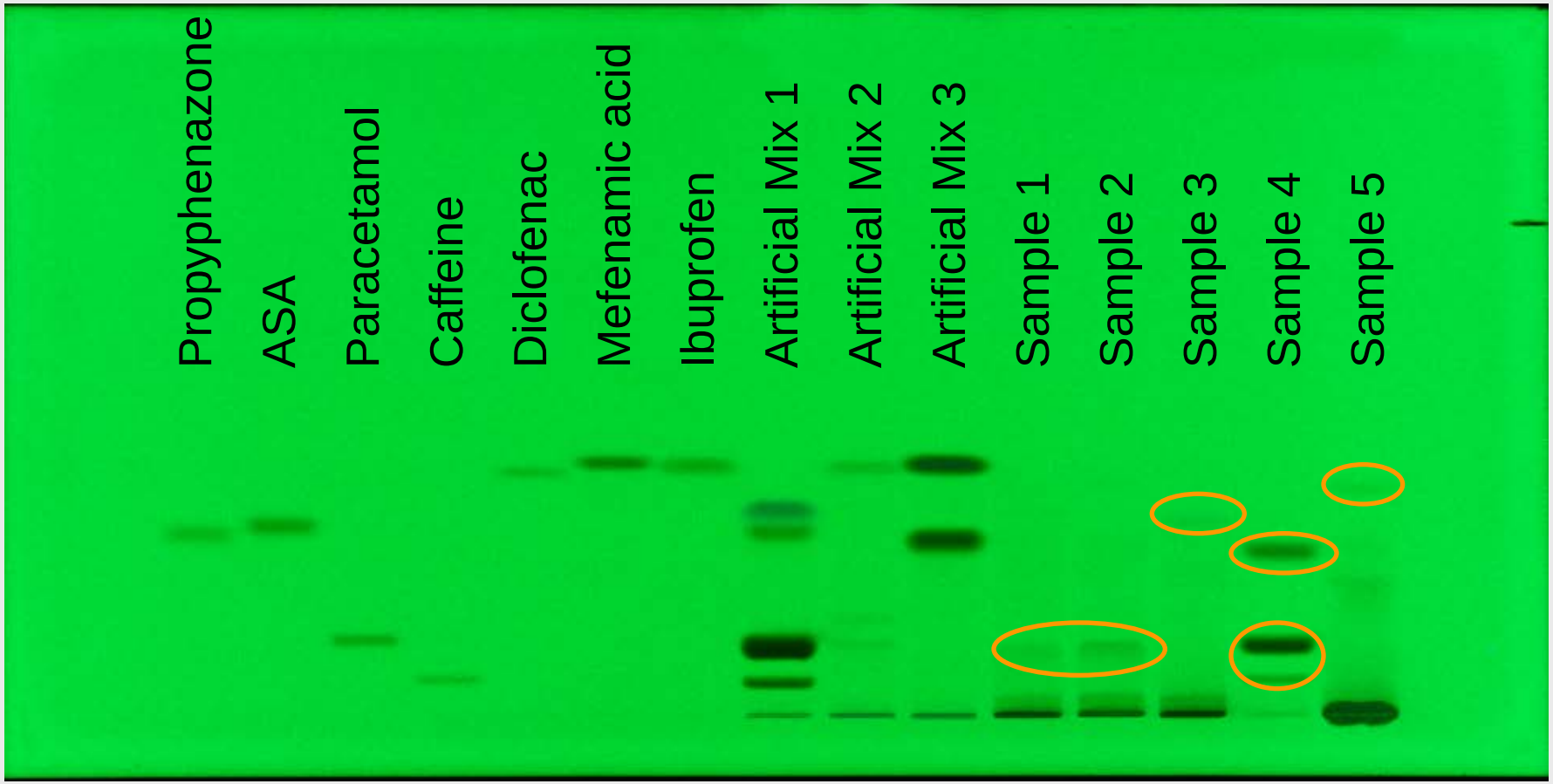
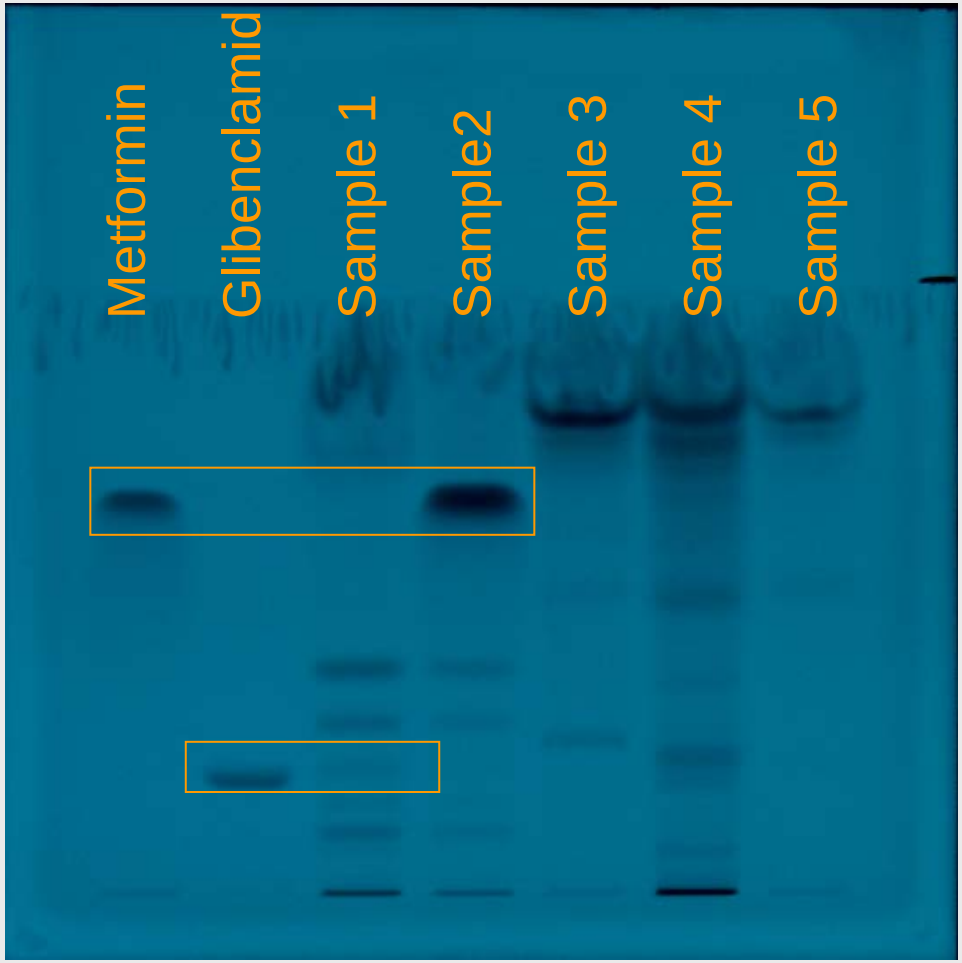
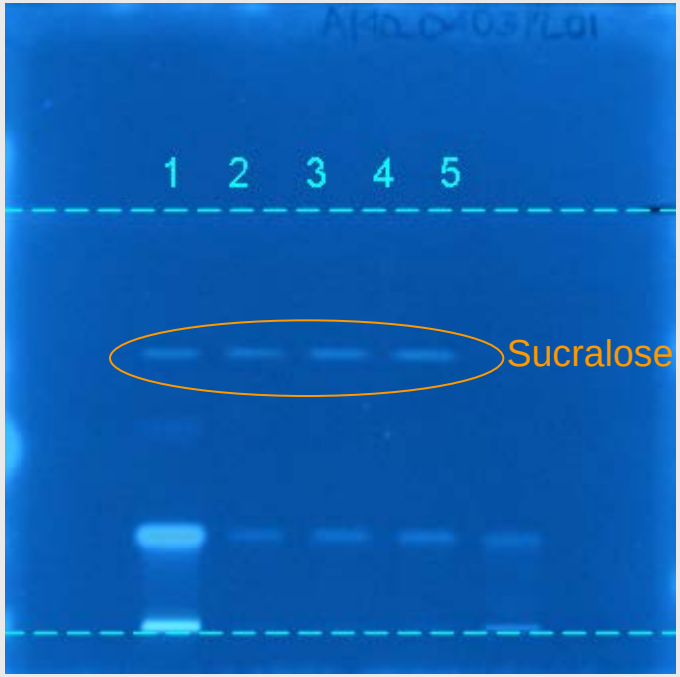
Synthetic drugs in TCM: Pain killers



Synthetic drugs in TCM: Antidiabetics



Sucralose in beverages



Analytical challenge

- Sucralose shows no UV absorbance. Detection for HPLC has to be performed by derivatization, refractive index, amperometric etc.

  → HPTLC is the method of choice:

  the amino phase allows direct derivatization by heating

1: Neat beverage (sucralose is in the calibration range)
2 - 4: Fructose (Rf=0.3) and sucralose (Rf=0.7)
5: Diluted beverage (fructose is in the calibration range)

CAMAG Application Note A-83.1

Determination of sucralose and fructose in food and beverages

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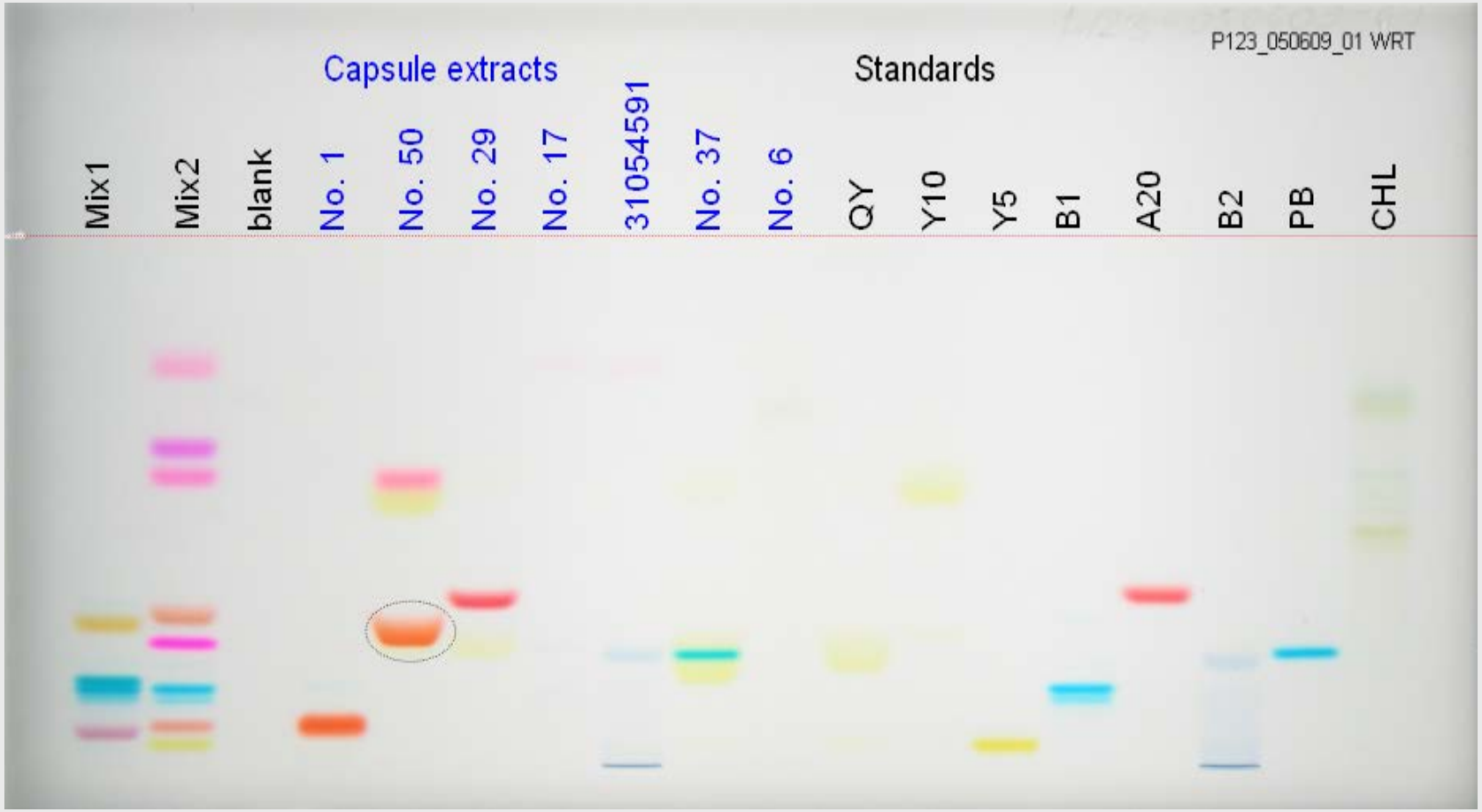
Analysis of food colors from capsules



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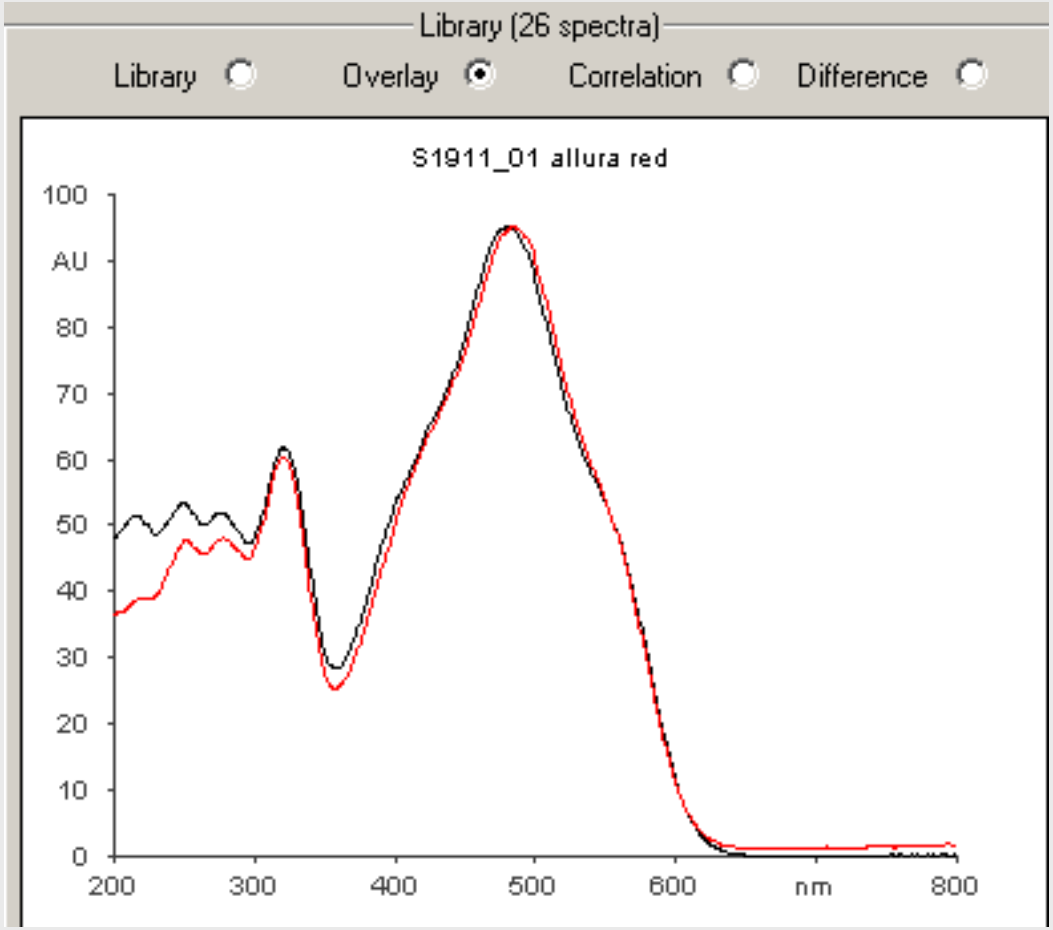
Analysis of food colors from capsules



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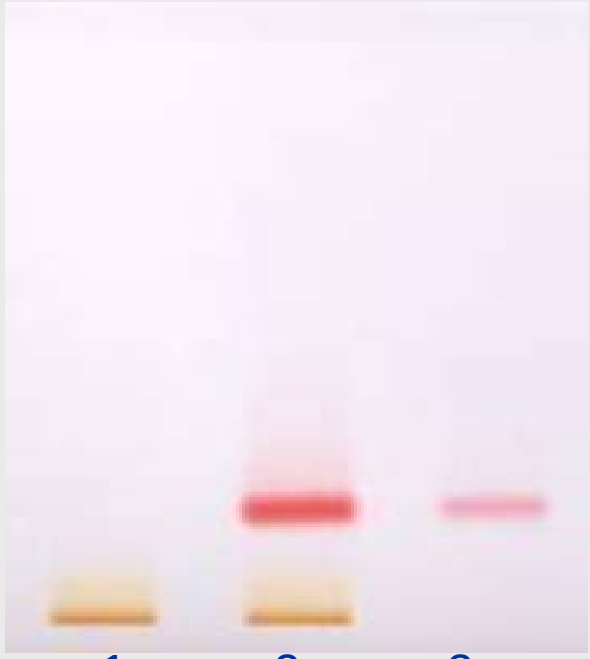
Illegal dyes in spices

- Screening of 15 illegal dyes

Mix 1	R_F	Relative R_F			Relative R_F	R_F	Mix 2
Para Red	0.60	1.22			1.38	0.66	Disp. Orange 11
Citrus Red 2	0.54	1.10			1.23	0.59	Butter Yellow
Sudan I*	0.49	1.00			1.10	0.53	Toluidine Red
Sudan II	0.33	0.67			1.00	0.48	Sudan Red G*
Sudan III	0.23	0.47			0.83	0.40	FD&C Orange 2
Sudan IV	0.16	0.33			0.44	0.21	Sudan Red 7B
-	-	-			0.31	0.15	Sudan Red B

Illegal dyes in spices

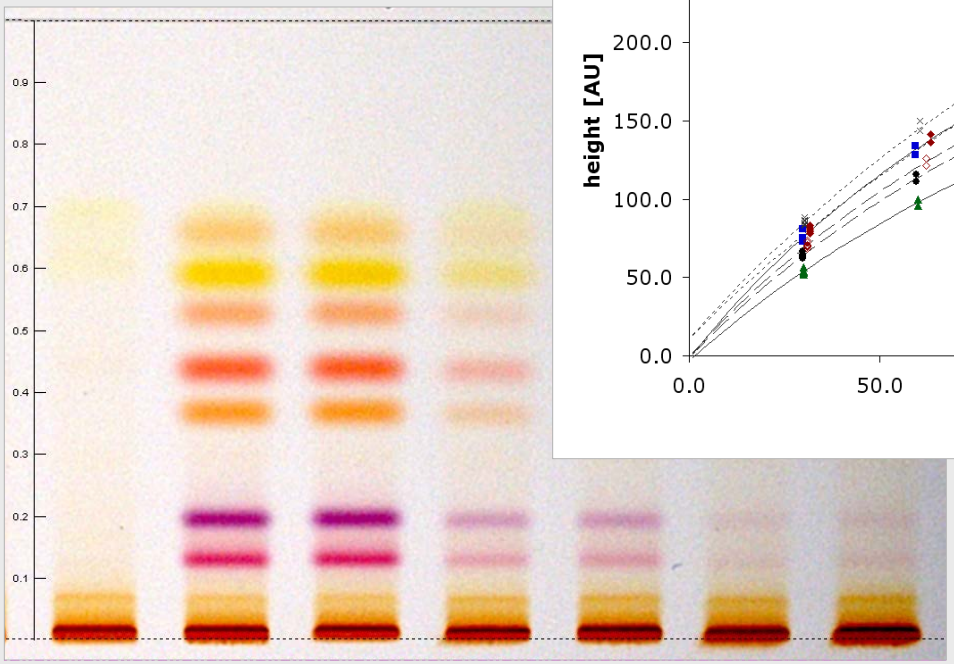


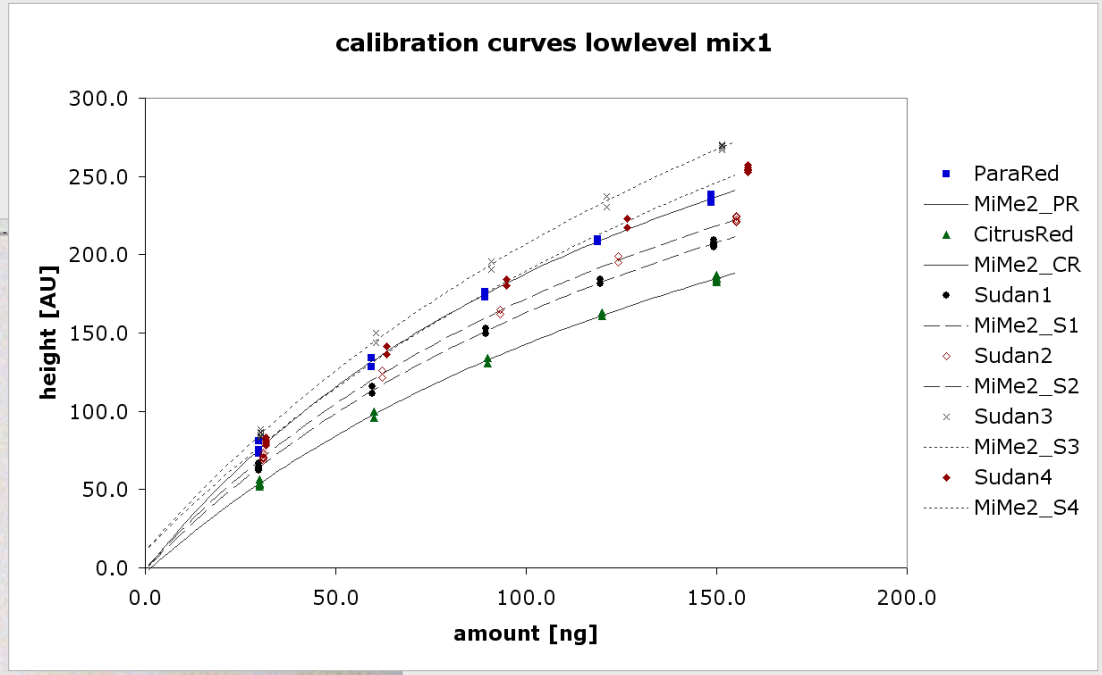
1: Paprika extract
2: Paprika spiked with Sudan III
3: Sudan III

Analytical challenges

- A broad range of illegal dyes with different chemical properties shall be detected
  → TLC is the method of choice
- Interferences by sample matrix and natural dyes (carotinoids)
  → Selective oxidation of carotinoids

Illegal dyes in spices





HPTLC detection of the azo dye amaranth as an adulterant of Bilberry extract

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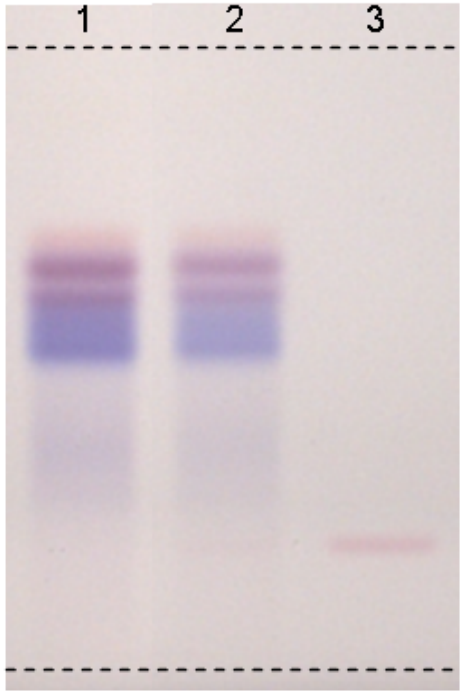

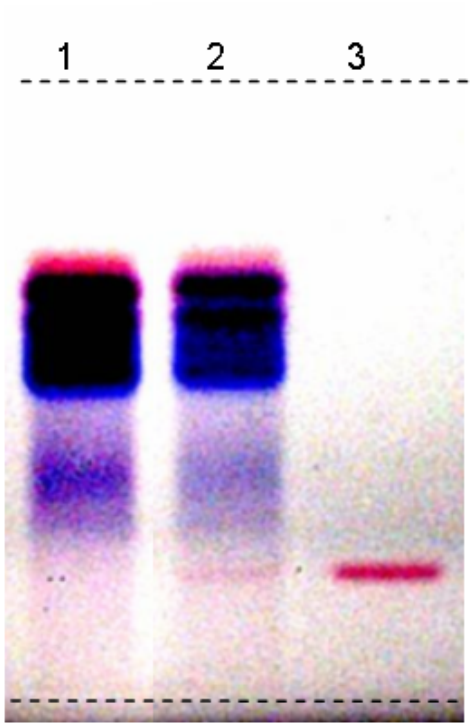

1: Bilberry dry extract
2: Bilberry dry extract spiked with amaranth (spiking level 0.25 %)
3. Amaranth

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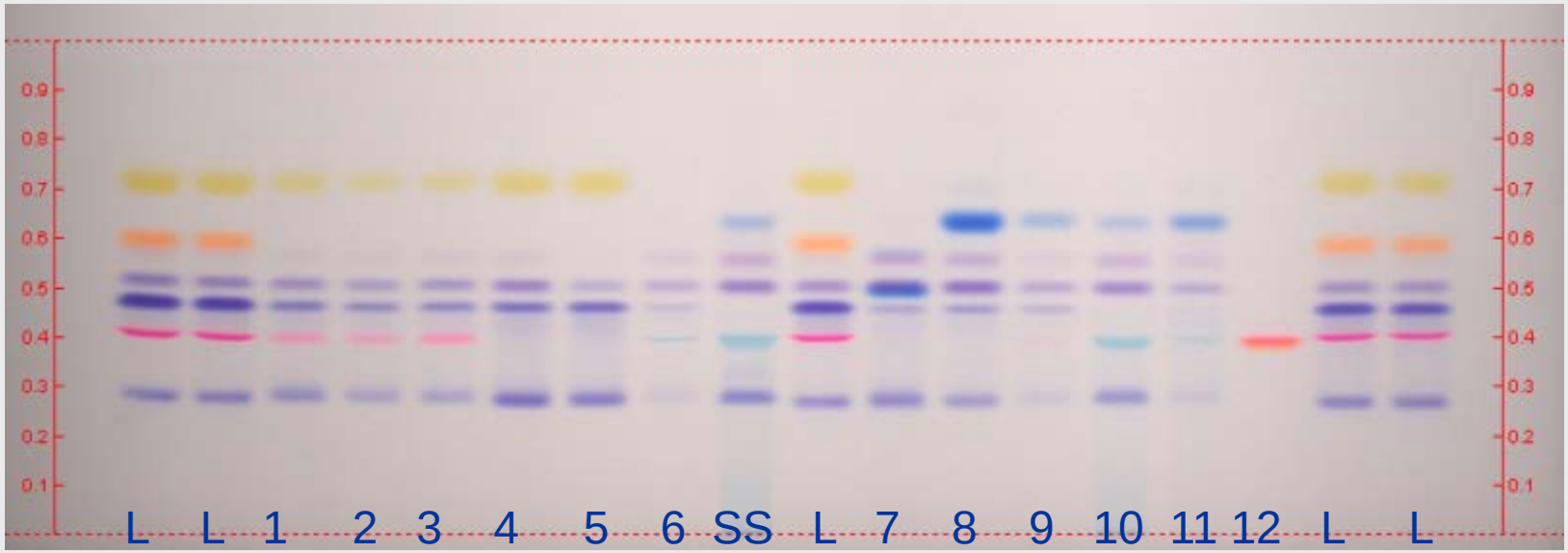
HPTLC analysis of inks



L: Ladder (Standard mixture)
SS: System suitability test
1-12: Various samples of ball point inks

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Phospholipids

Method from Literature

Phospholipids

ADC 2

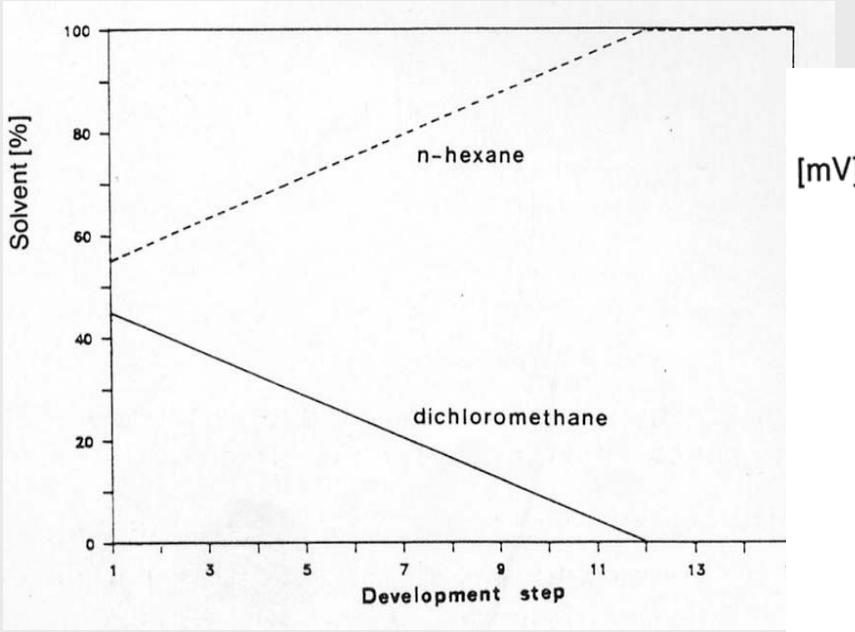
Mobile Phase: CHCl3, MeO
Humidity control (47%)

AMD 2

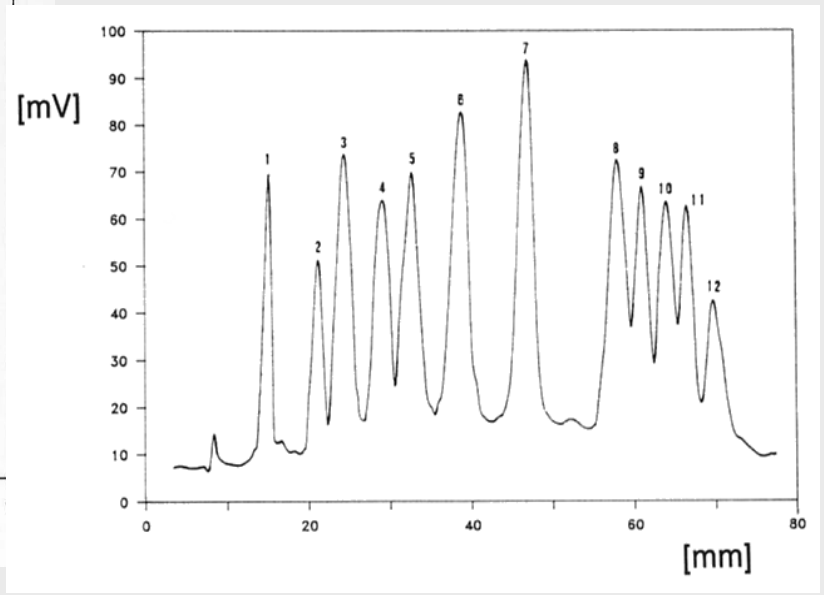
Universal gradient with 20 steps from MeOH/H2O 98/2 to CHCl3 to hexane, preconditioned with 1 N NH3 25%

Organochlorine pesticides by AMD

Methoxychlor, Dieldrin, δ-HCH, Heptachlorepoxide, β-HCH, Lindane, γ-HCH, p,p‘-DDT, o,p‘-DDE, p,p‘-DDE, Aldrin, HCB

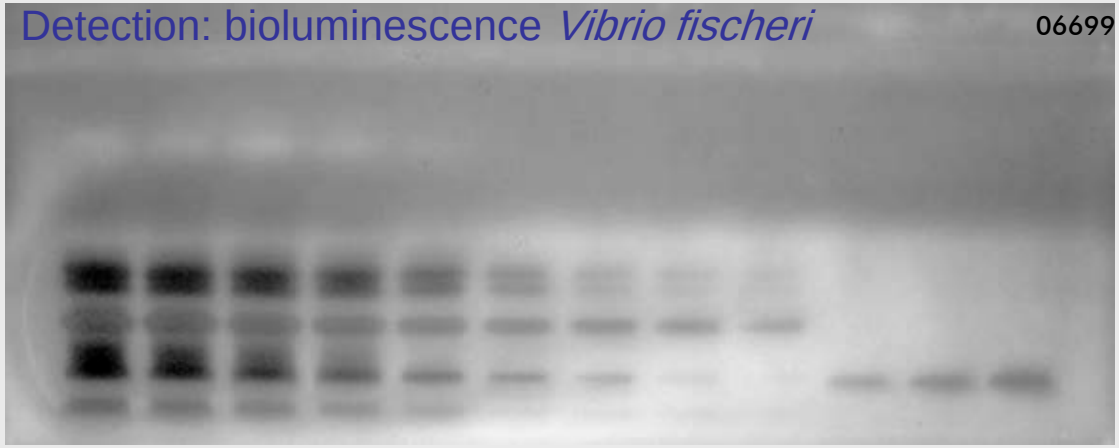


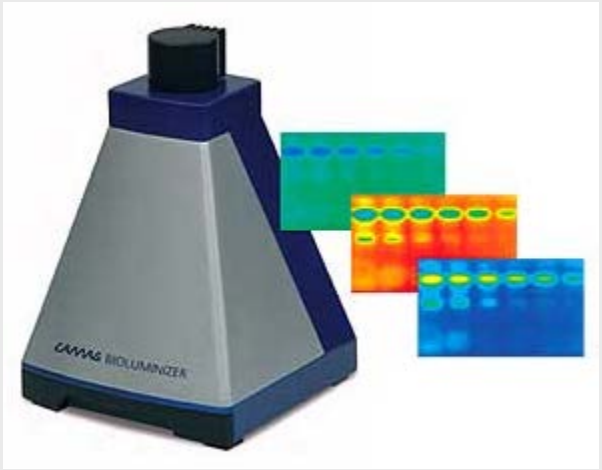
AMD gradient elution

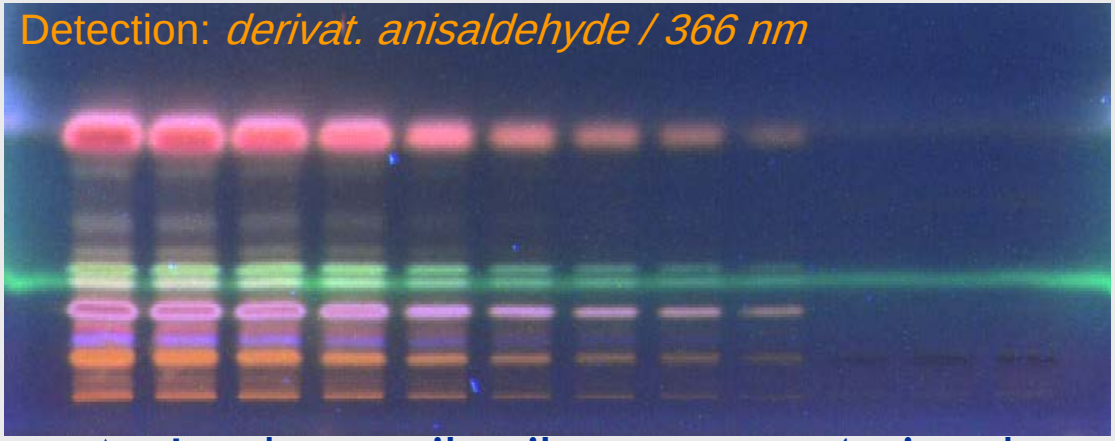


Chromatogram after gradient separation

Bioluminescence – BioLuminizer™



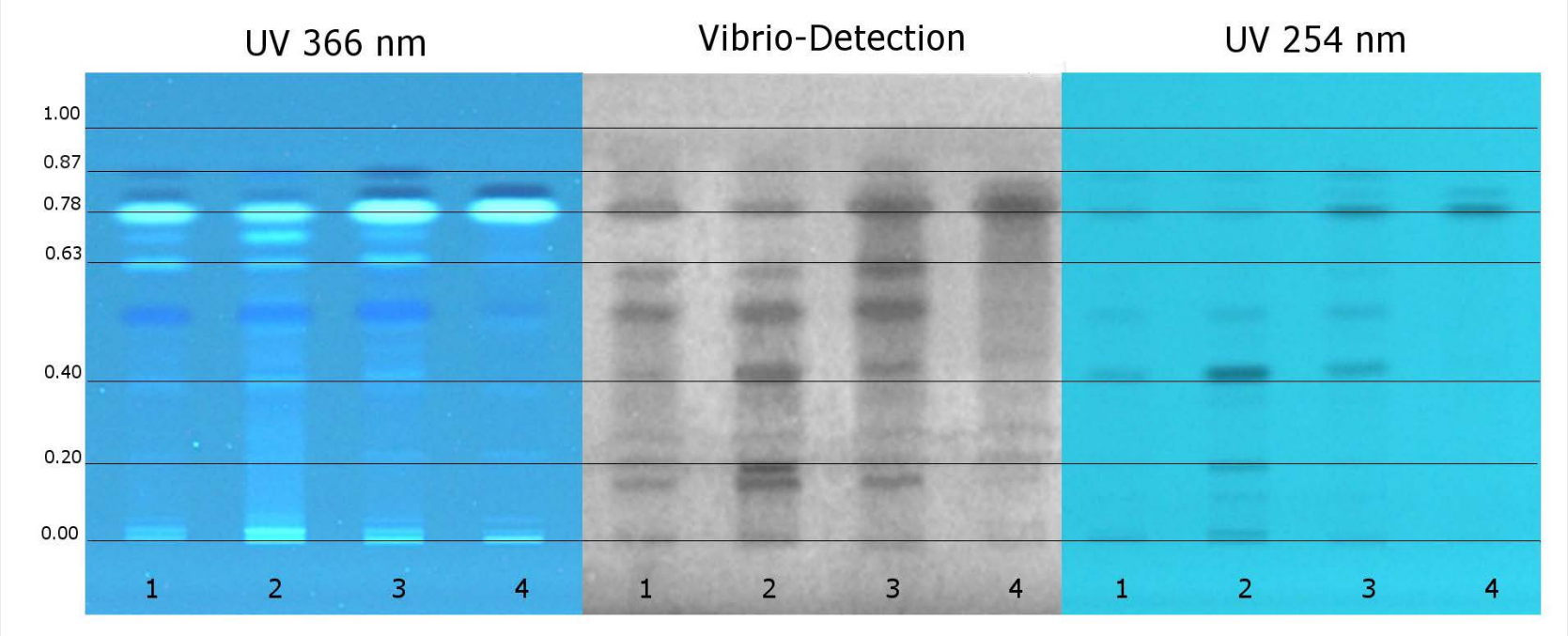




A - I : chamomile oil np : 4-nitrophenol

Bioluminescence – BioLuminizer™

Stability of sunscreen



1 Sunscreen irradiated on skin
2 Sunscreen irradiated in Suntest CPS+
3 Sunscreen irradiated on microscopic slide
4 Reference (Sunscreen not irradiated, on microscopic slide)

Bioluminescence – BioLuminizer™