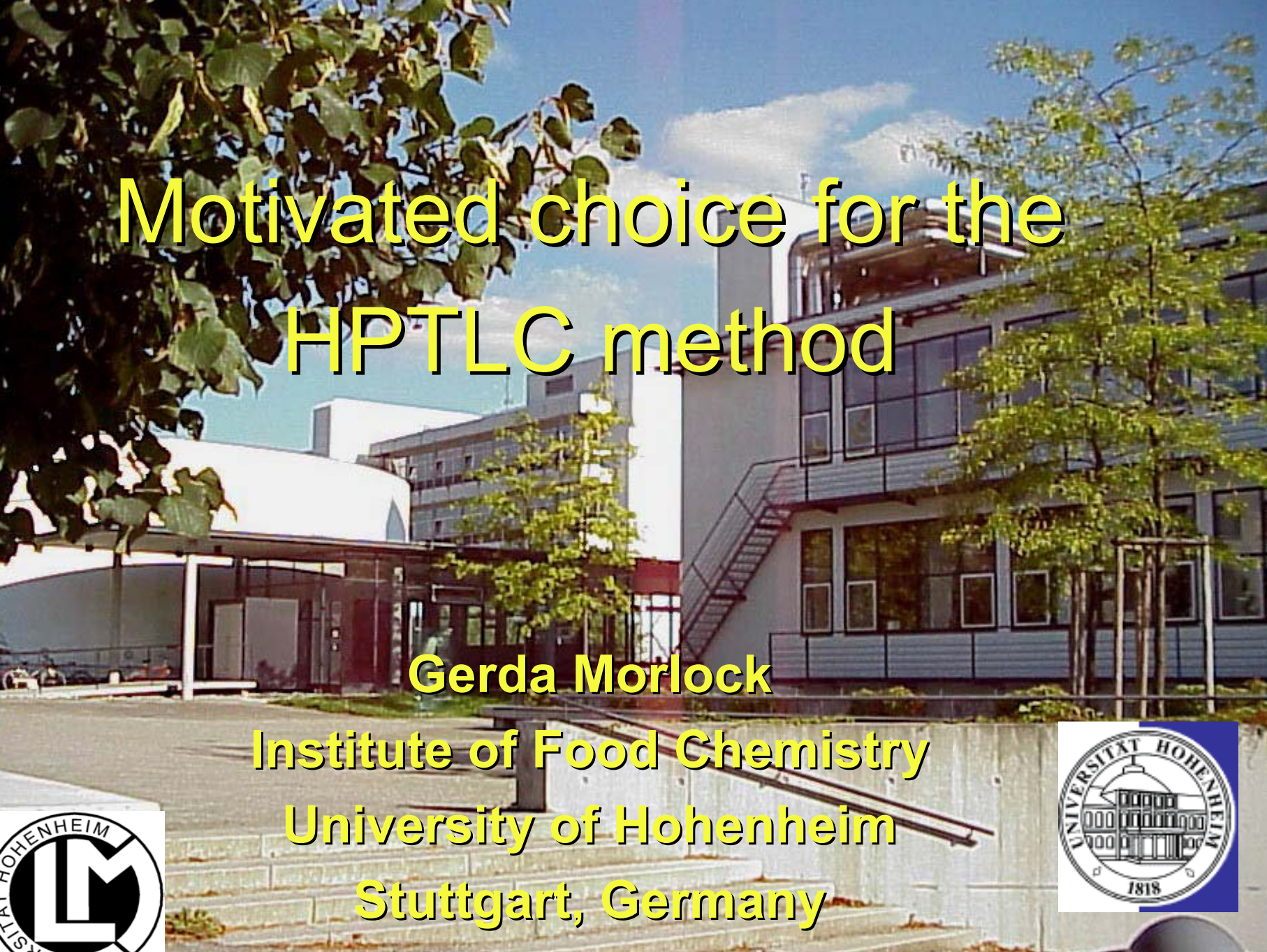
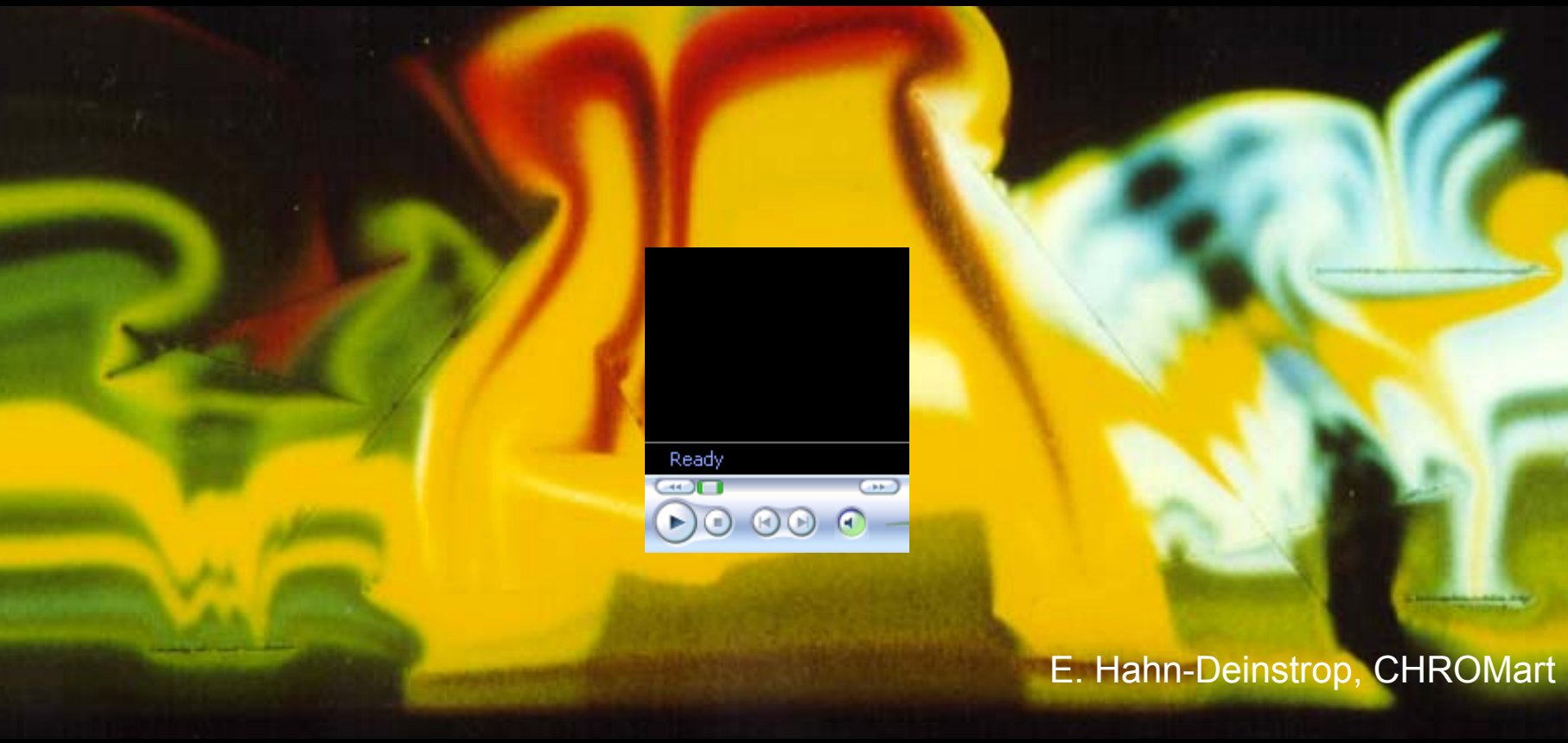
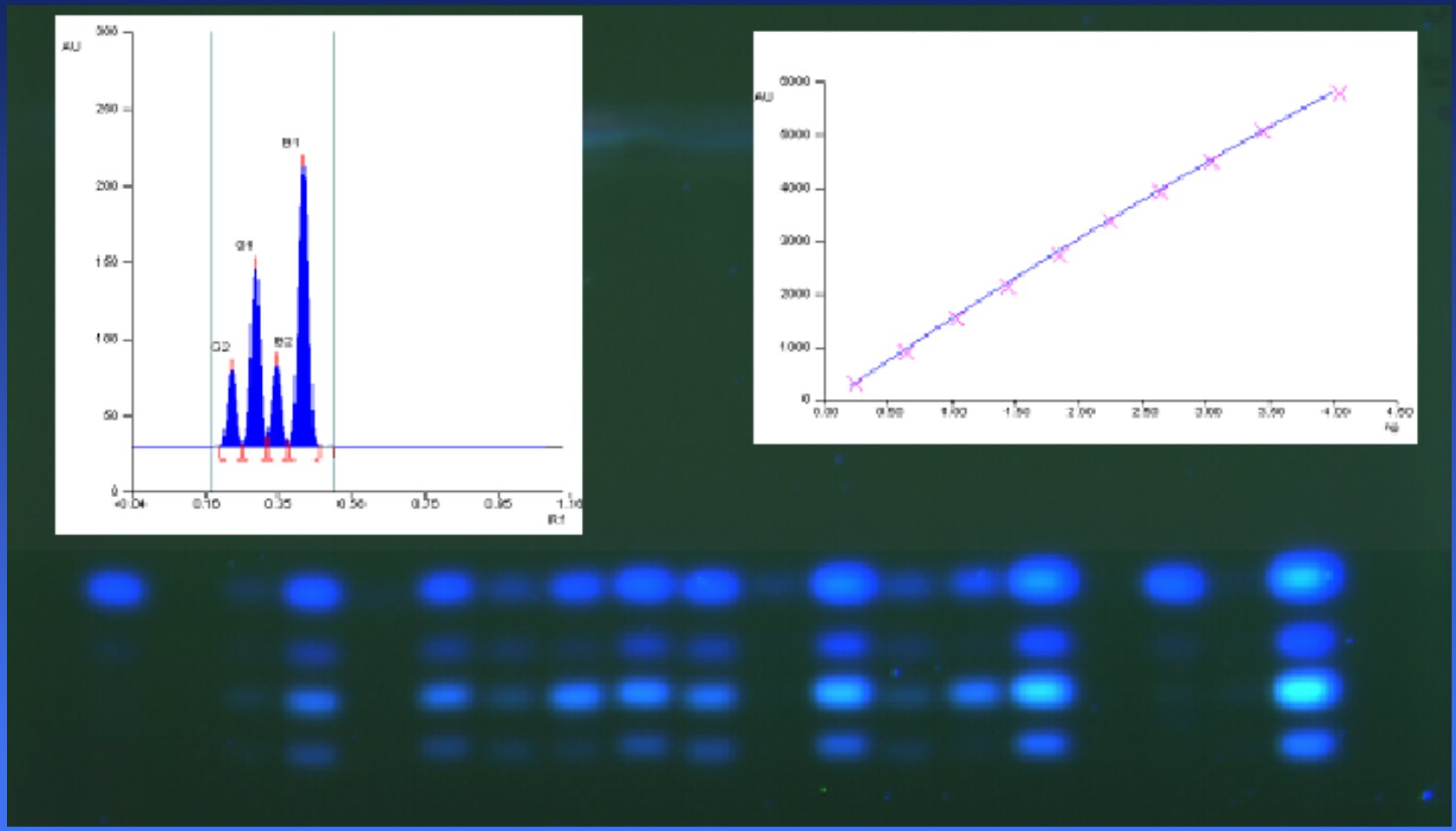


Motivated choice for the HPTLC method

Gerda Morlock
Institute of Food Chemistry
University of Hohenheim
Stuttgart, Germany

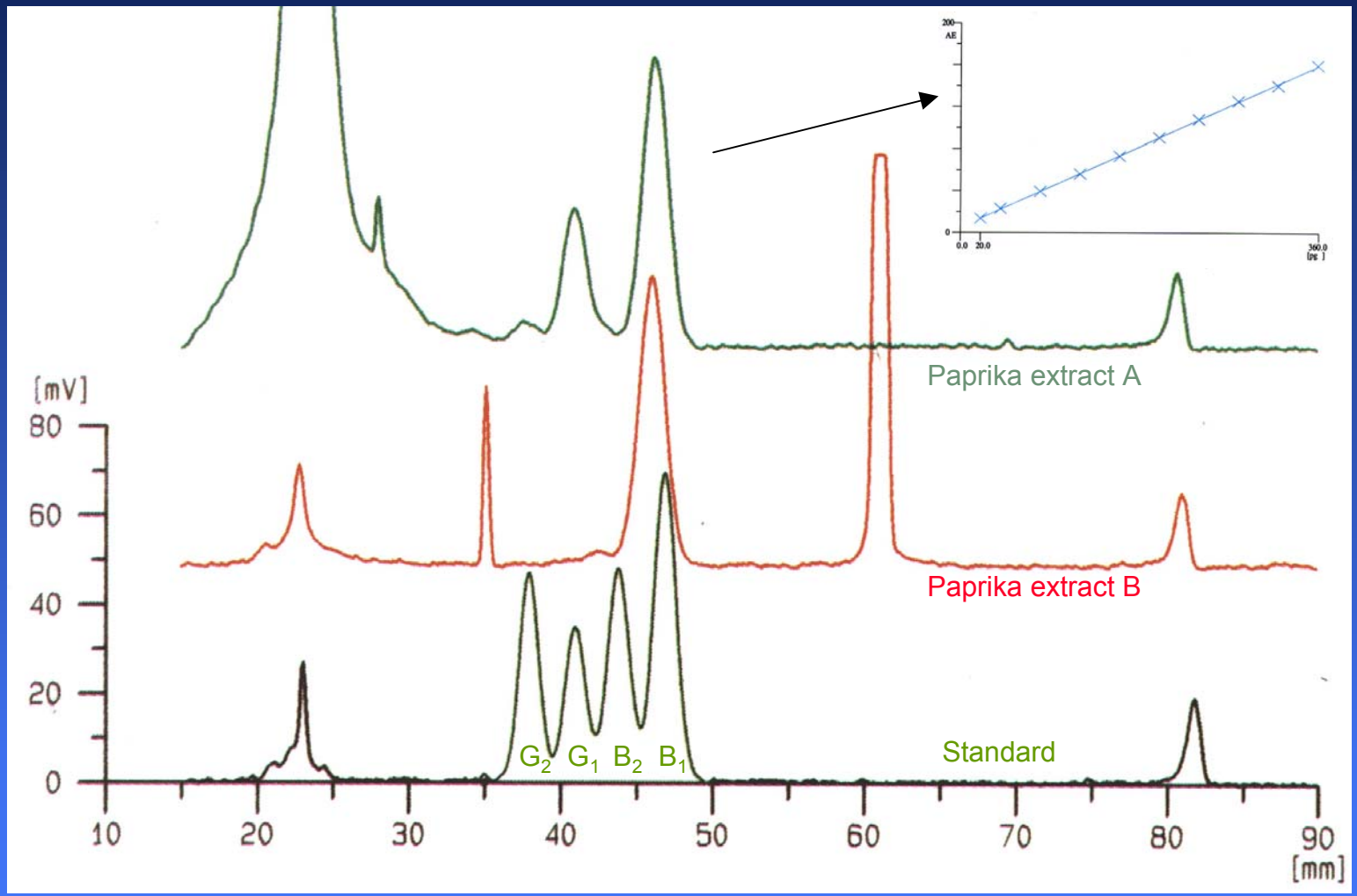

Ready
E. Hahn-Deinstrop, CHROMart

Aflatoxins in foodstuffs



CAMAG Laboratory Application Note 12.4

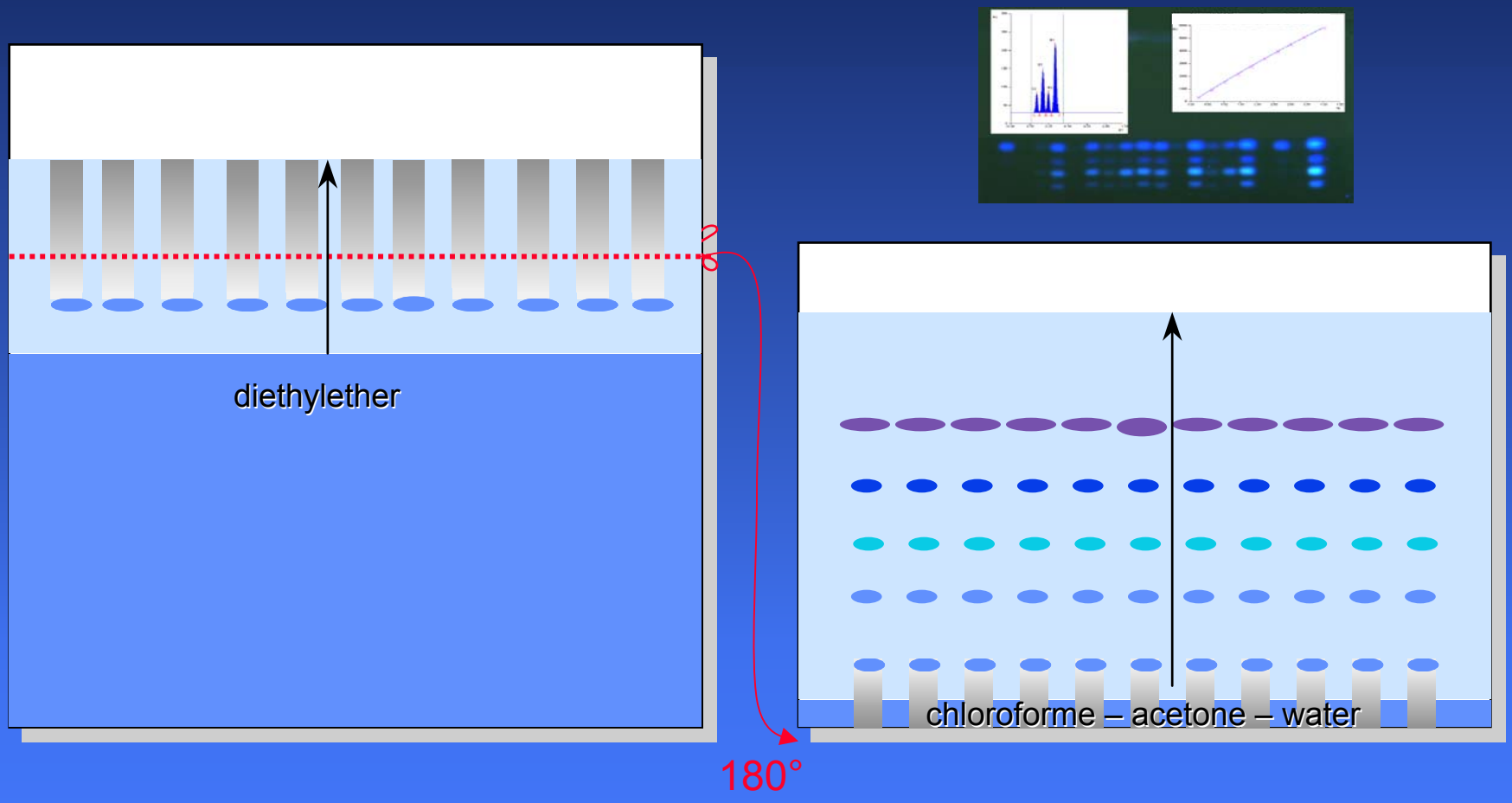
Aflatoxins in foodstuffs



J. Nagler et al., Natural Resources Institute, Chatham, GB, see CBS 79

Sample preparation on the plate of all samples simultaneously

Two fold separation with different solvents, plate turned by 180 °

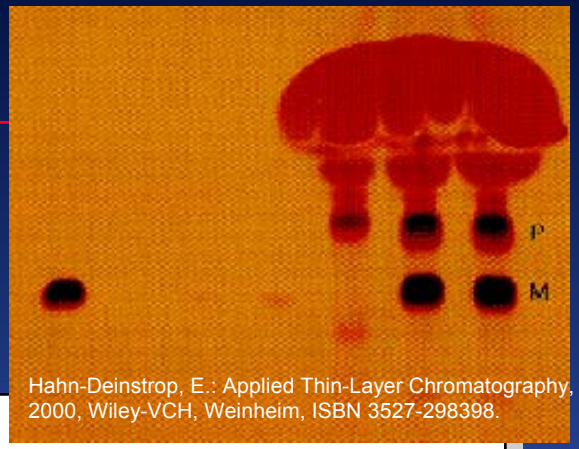


1. Removal of lipophilic matrix

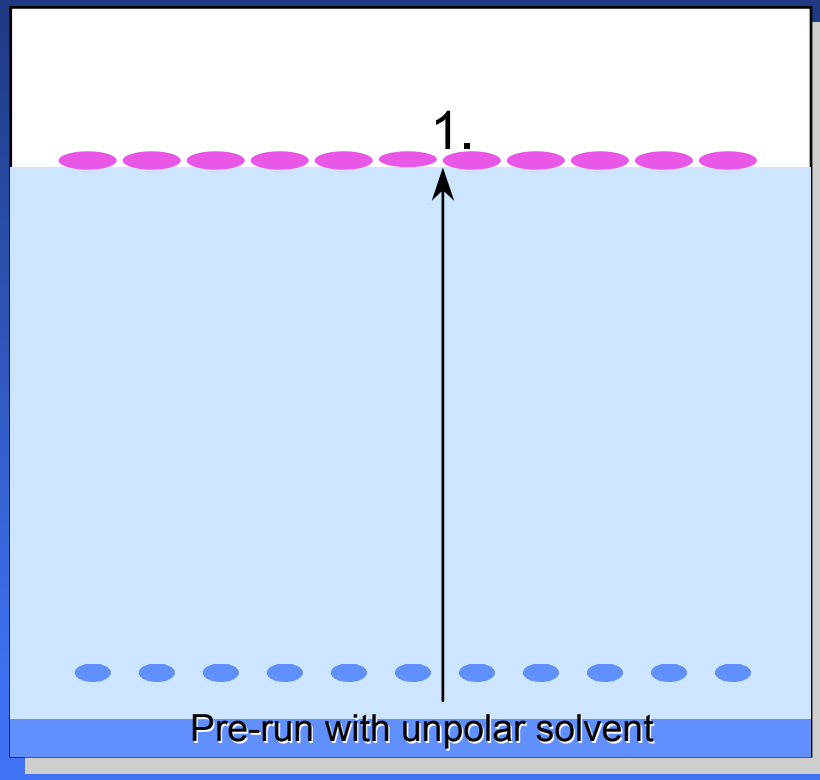
2. Separation of analytes

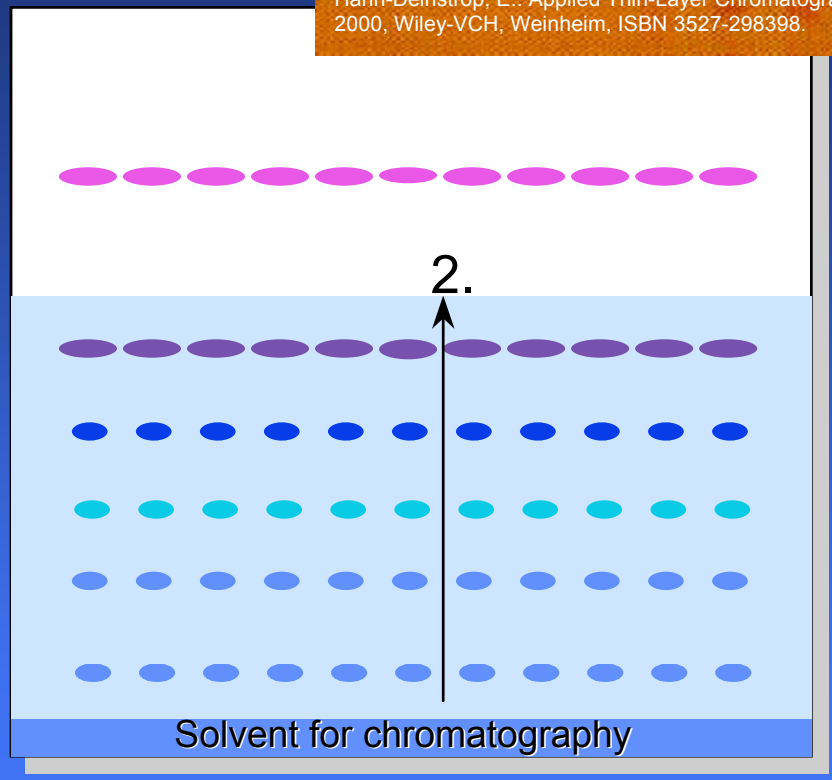
Sample preparation on the plate

Two fold separation with different solvents



Hahn-Deinstrop, E.: Applied Thin-Layer Chromatography, 2000, Wiley-VCH, Weinheim, ISBN 3527-298398.



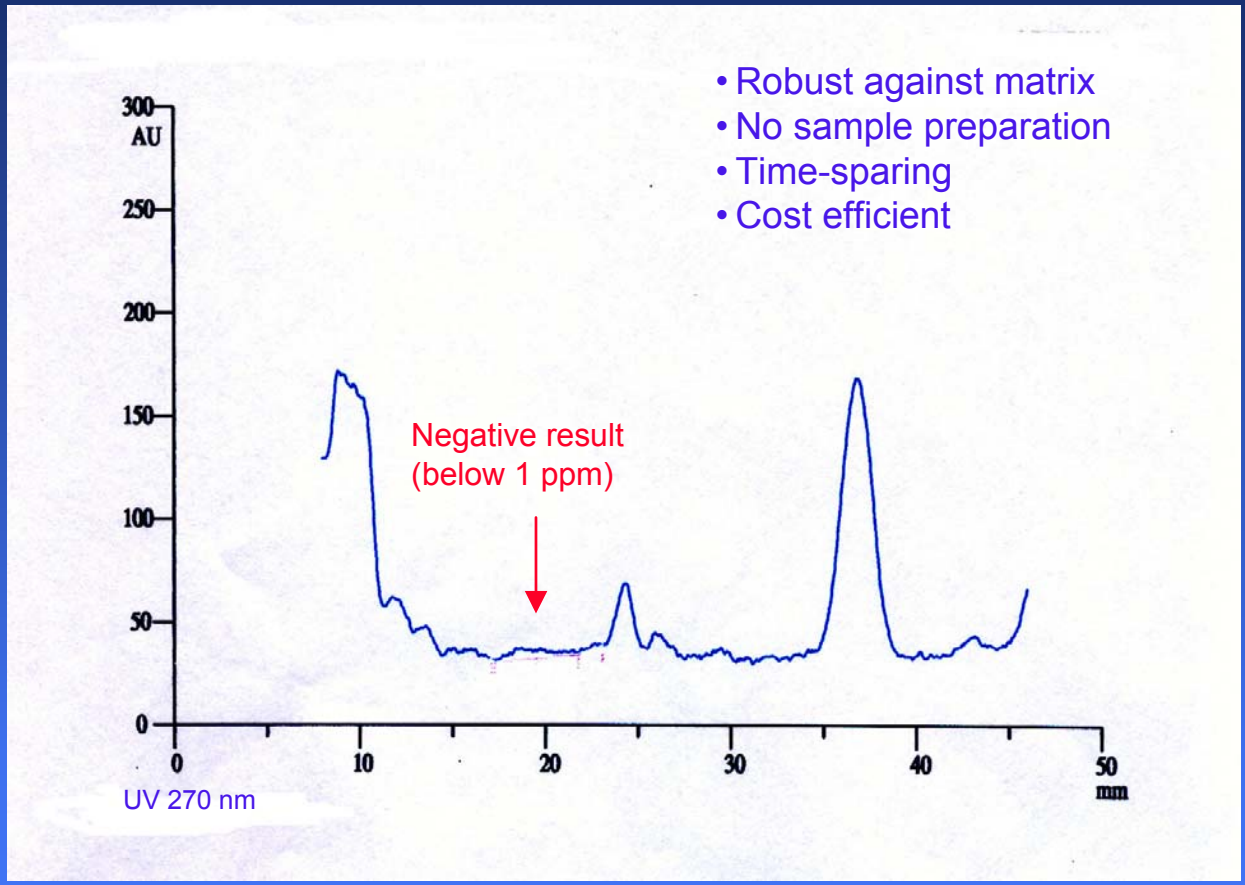


1. Removal of lipophilic matrix

2. Separation of analytes

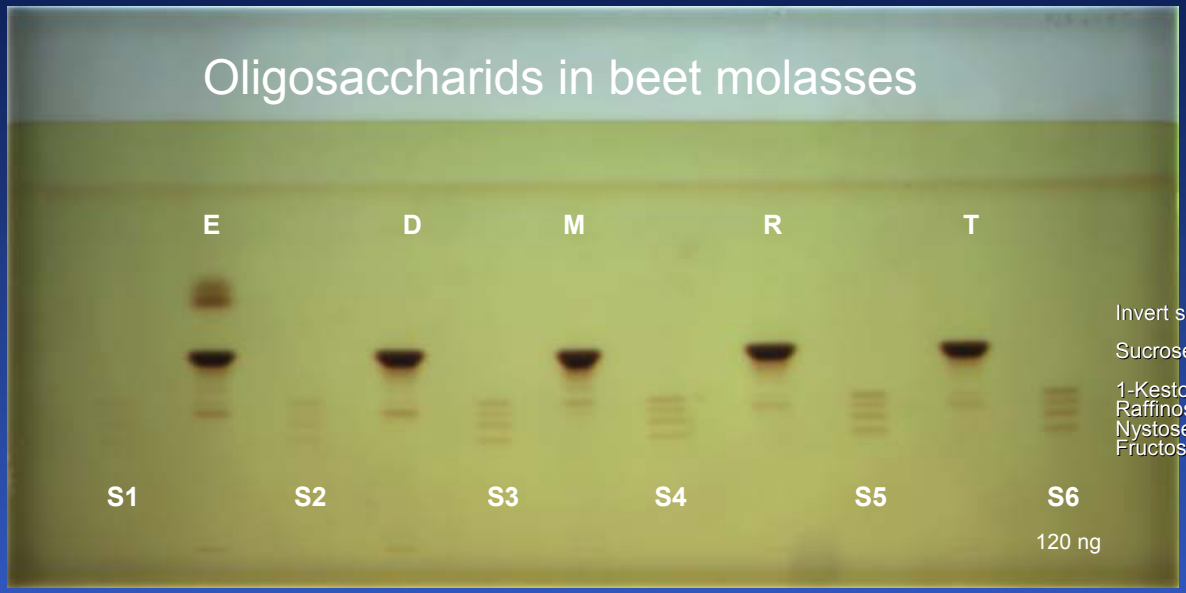
Skip sample preparation

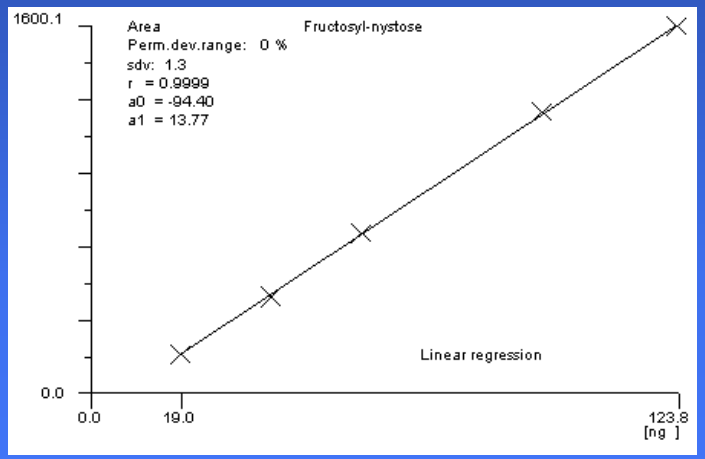
Antibiotics in industrial waste water

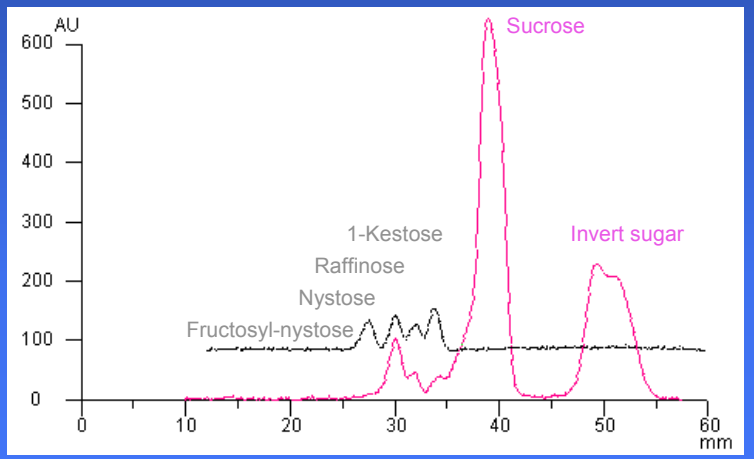


L. Vicard et al., Aventis Pharma, Neuville-sur-Saone, see CBS 90

As simple as possible

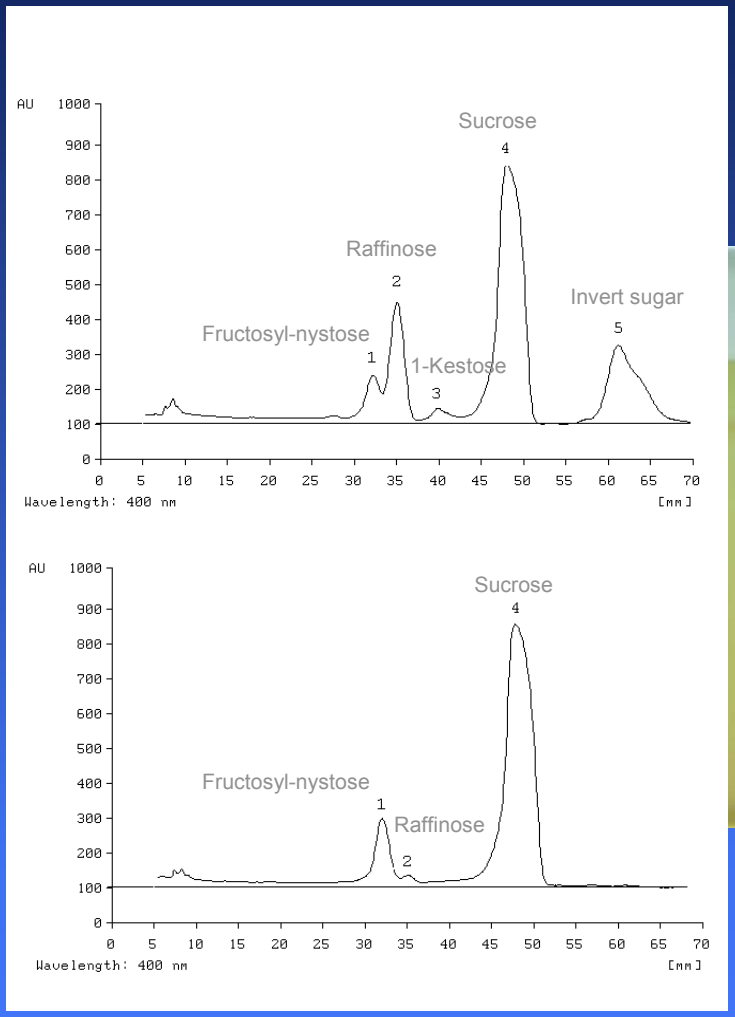


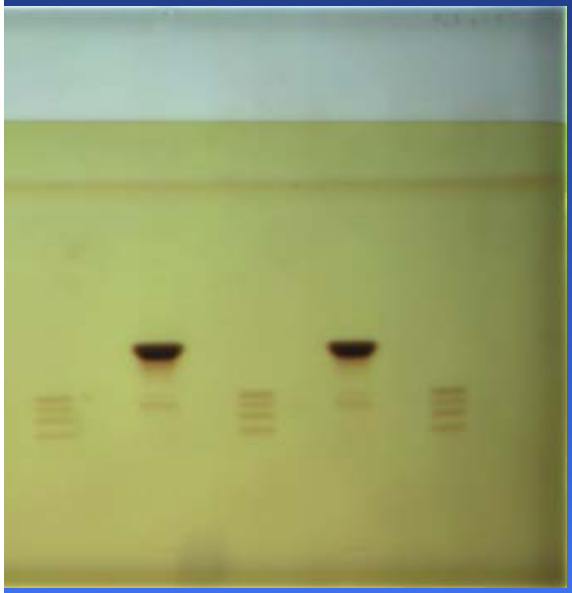




G. Lodi et al., University of Ferrara, Italy, see CBS 84

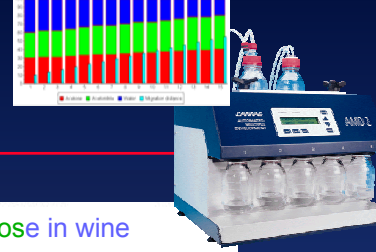
...and convenient derivatization

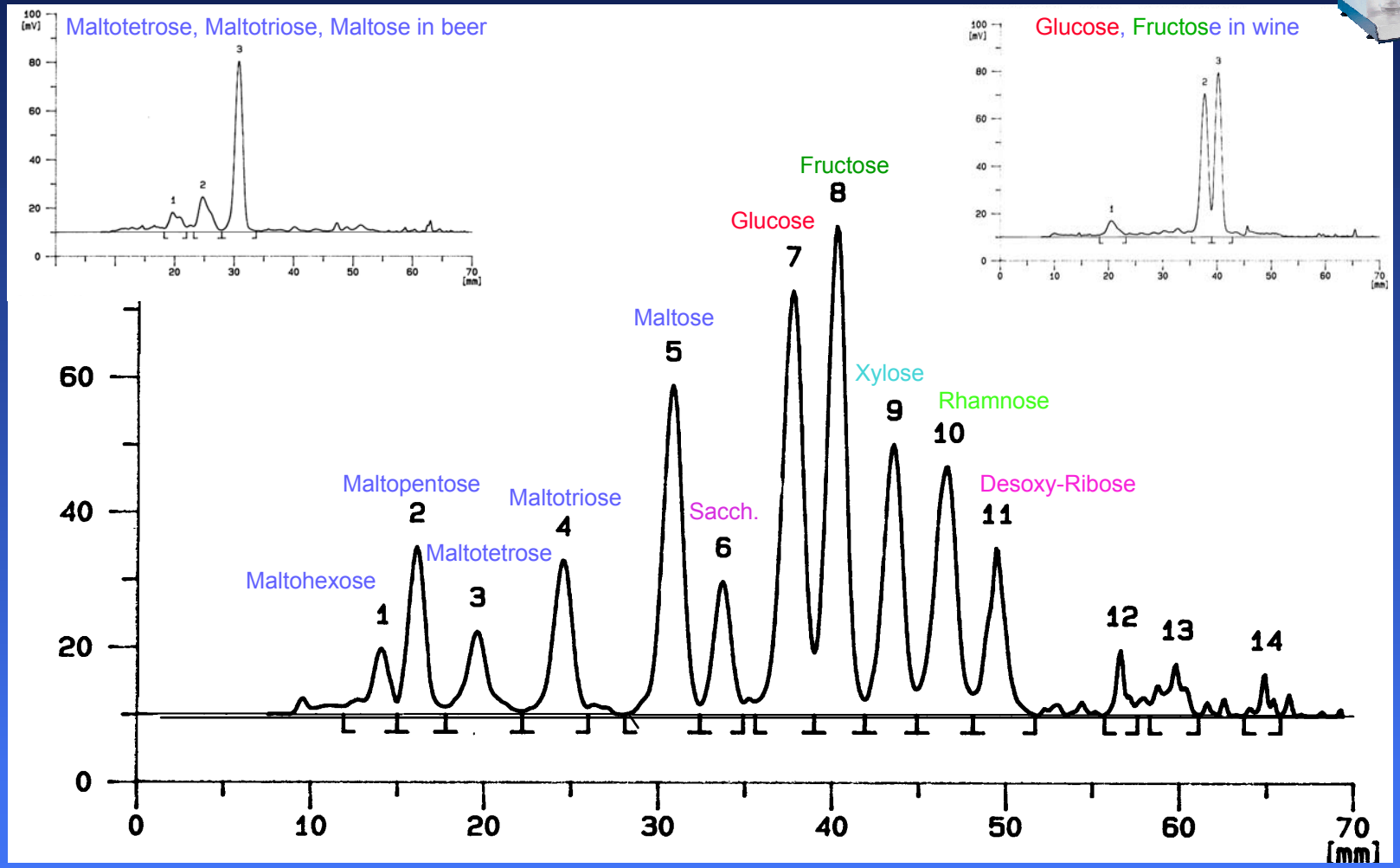




G. Lodi et al., University of Ferrara, Italy, see CBS 84

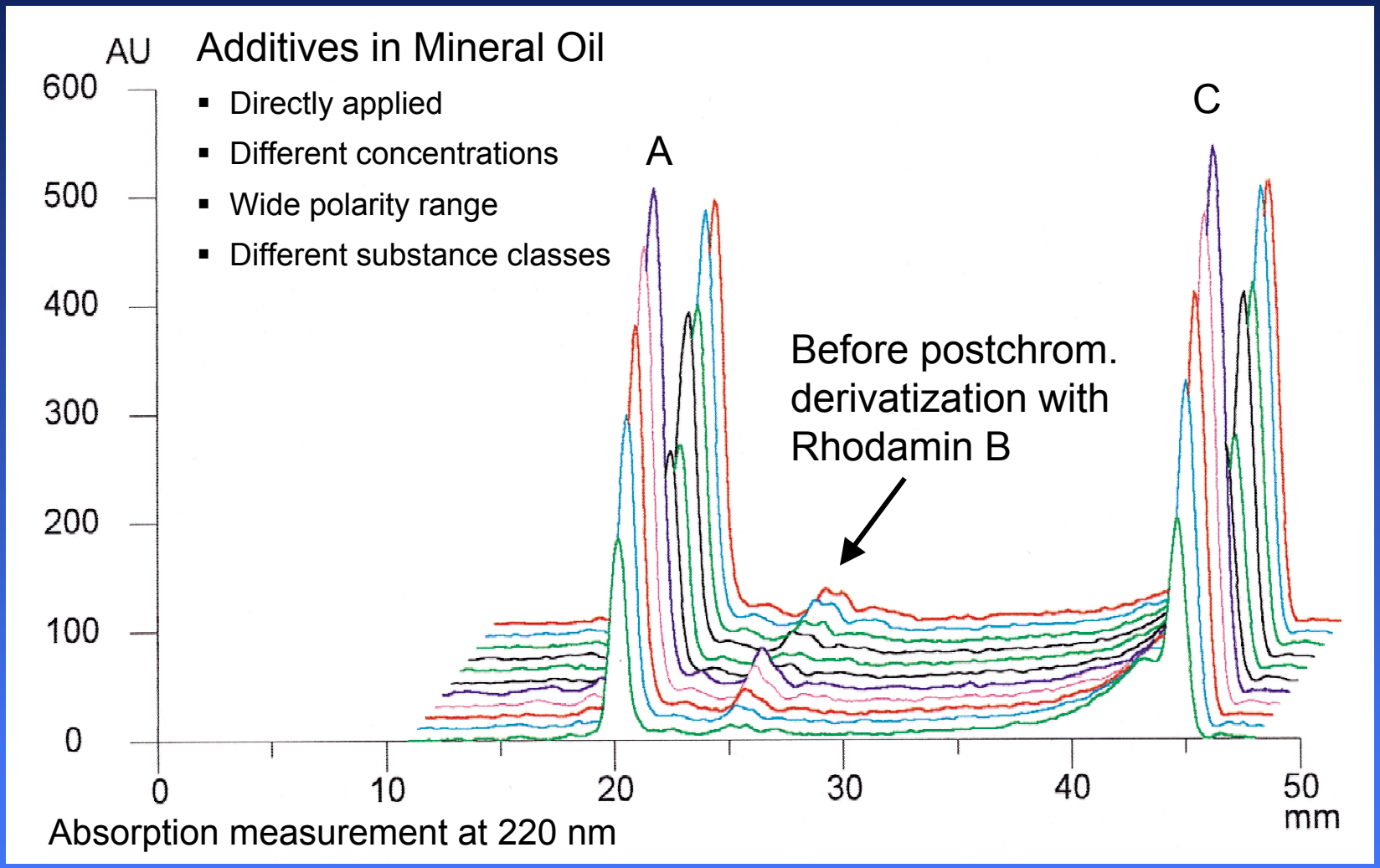
...or no derivatization at all on amino phases





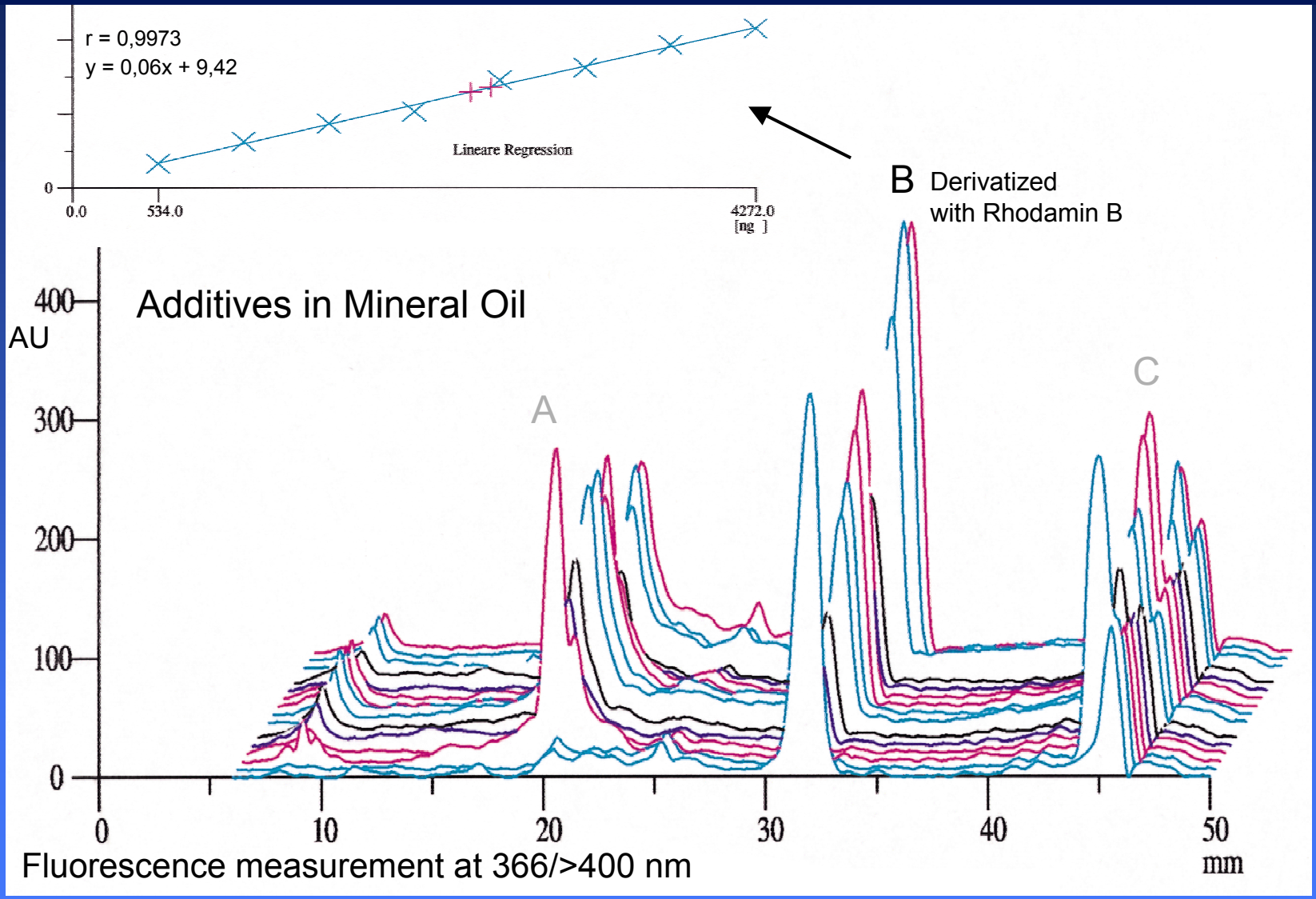
G. Lodi et al., University of Ferrara, Italy, see CBS 69

High matrix tolerance

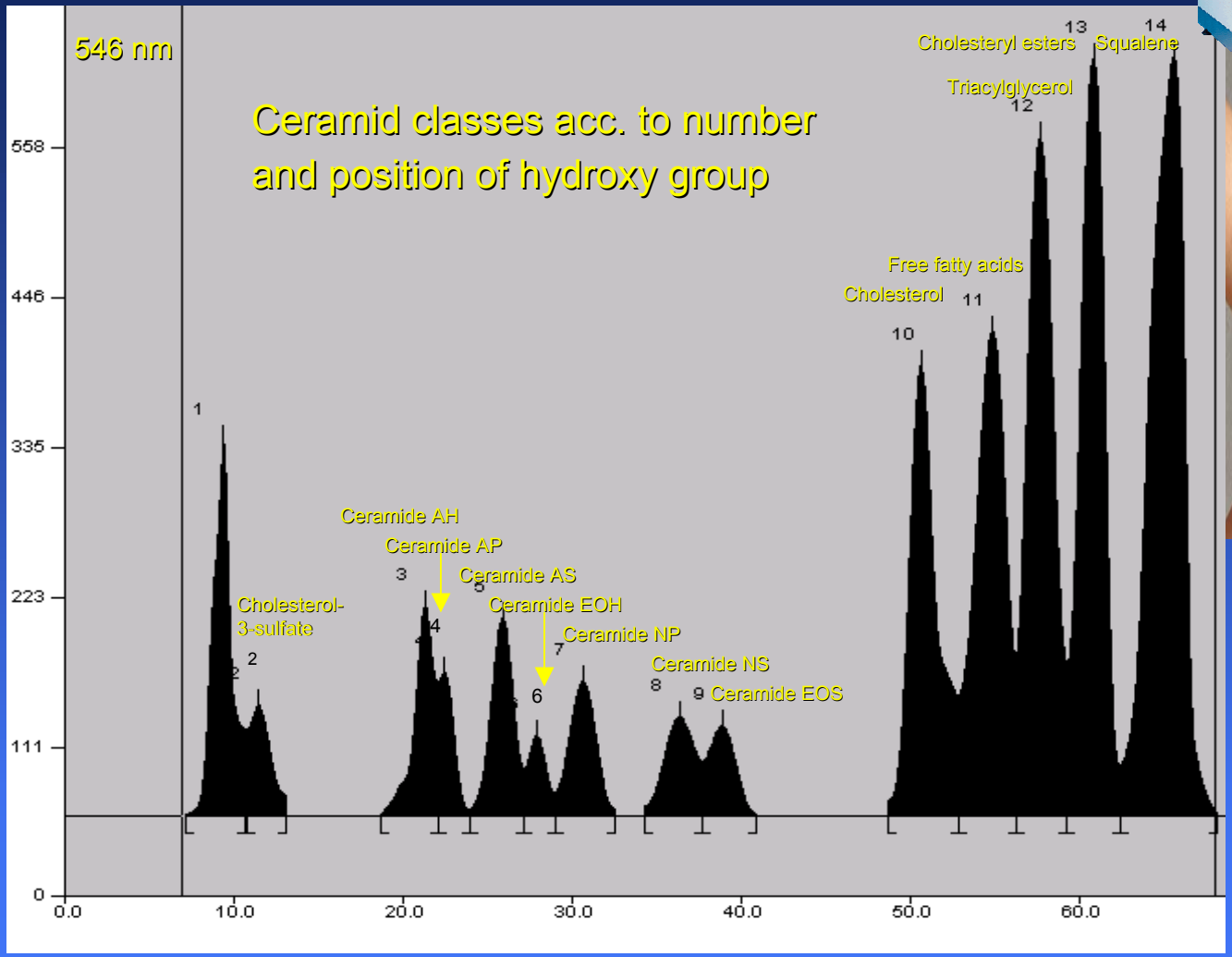


CAMAG Laboratory, see CBS 81

... and flexible detection

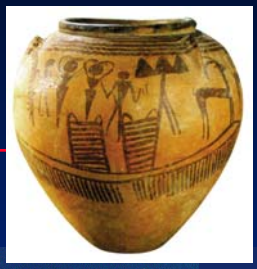


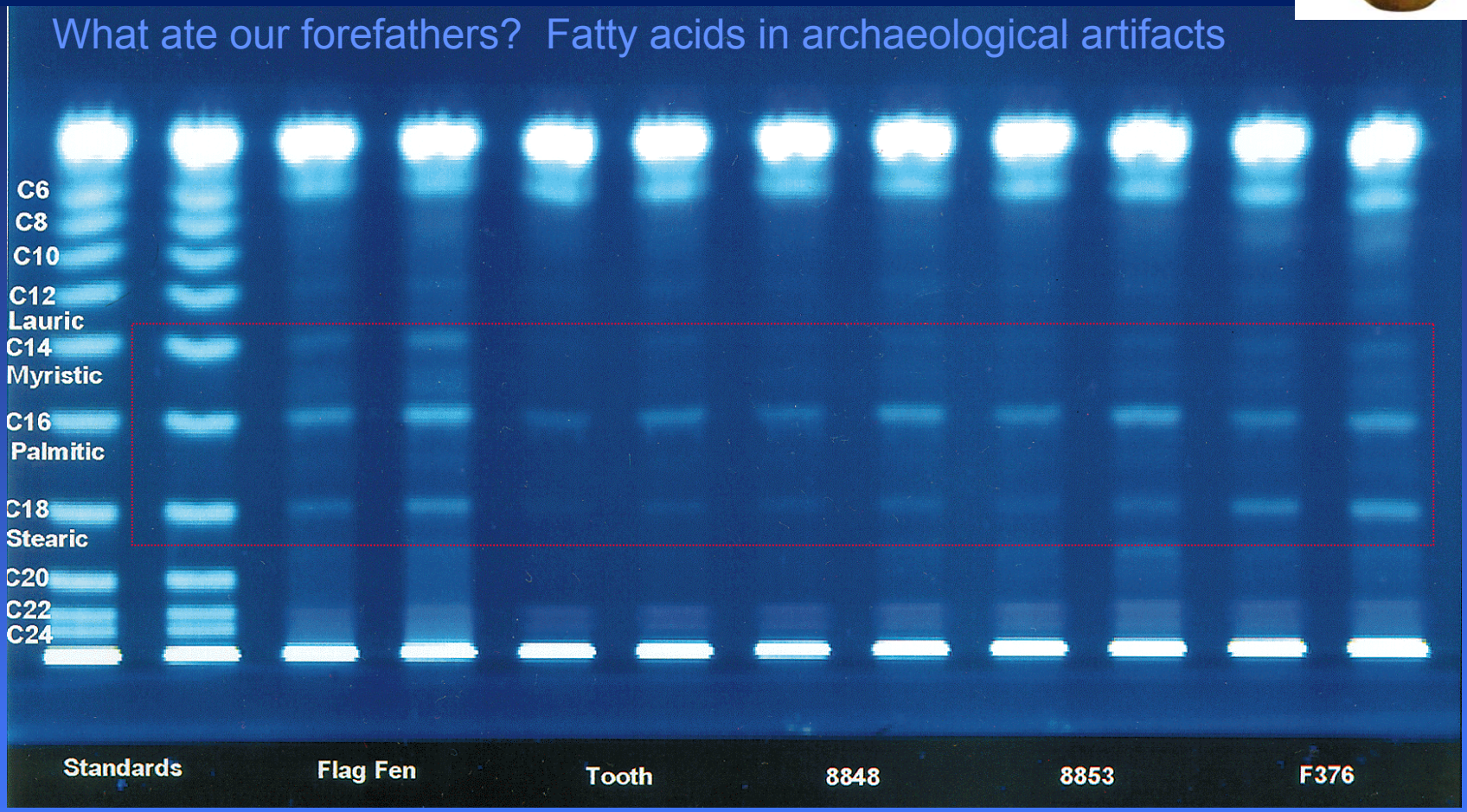
Perfect separation mechanism



K. Raith et al., University of Halle, see CBS 90

Effective detection by prechrom. derivatization in situ

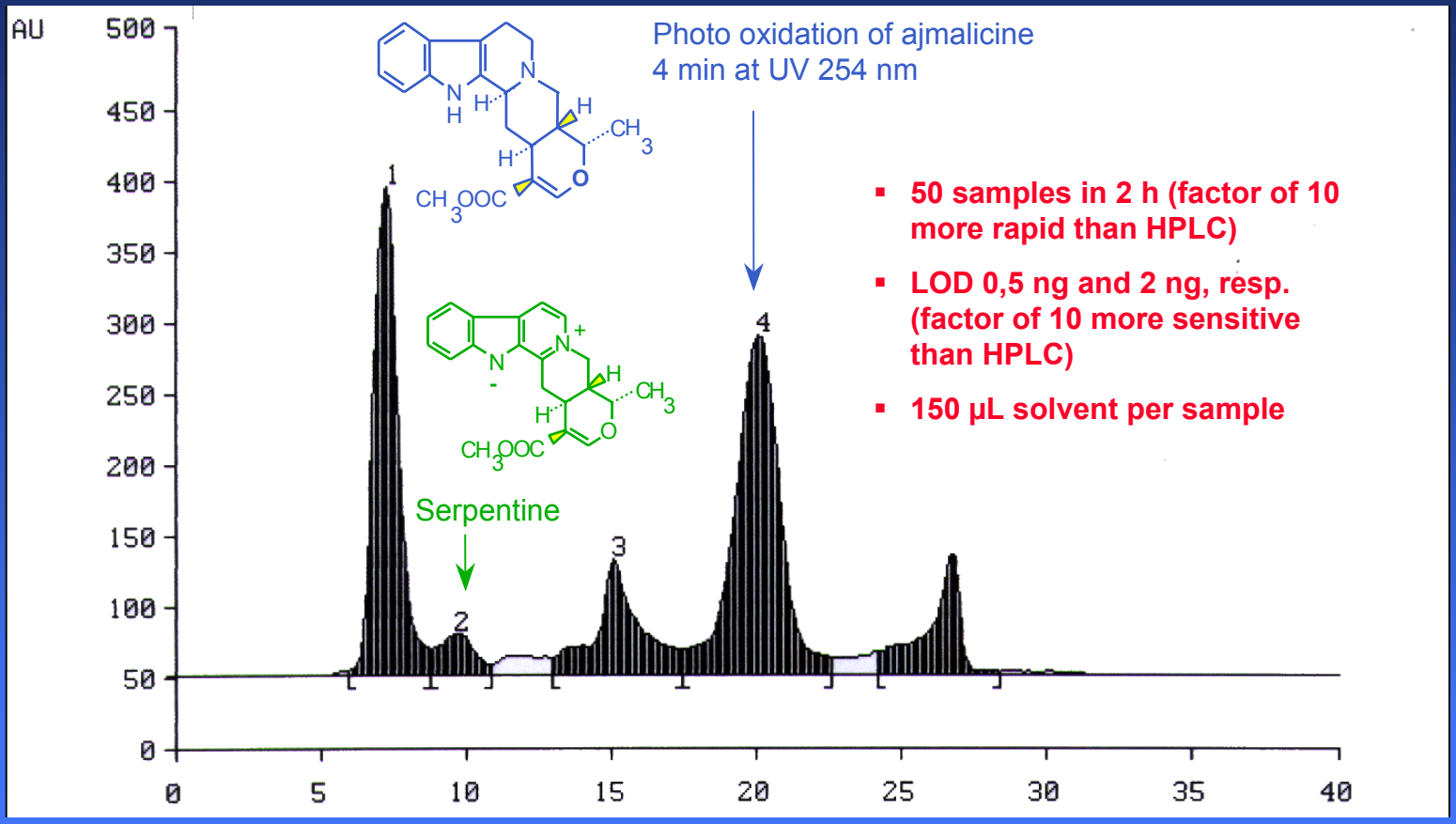




P. Jones et al., Time Team, and CAMAG Team
at Food Science Research Laboratory, University of Bournemouth, GB, see CBS 85

Creative detection

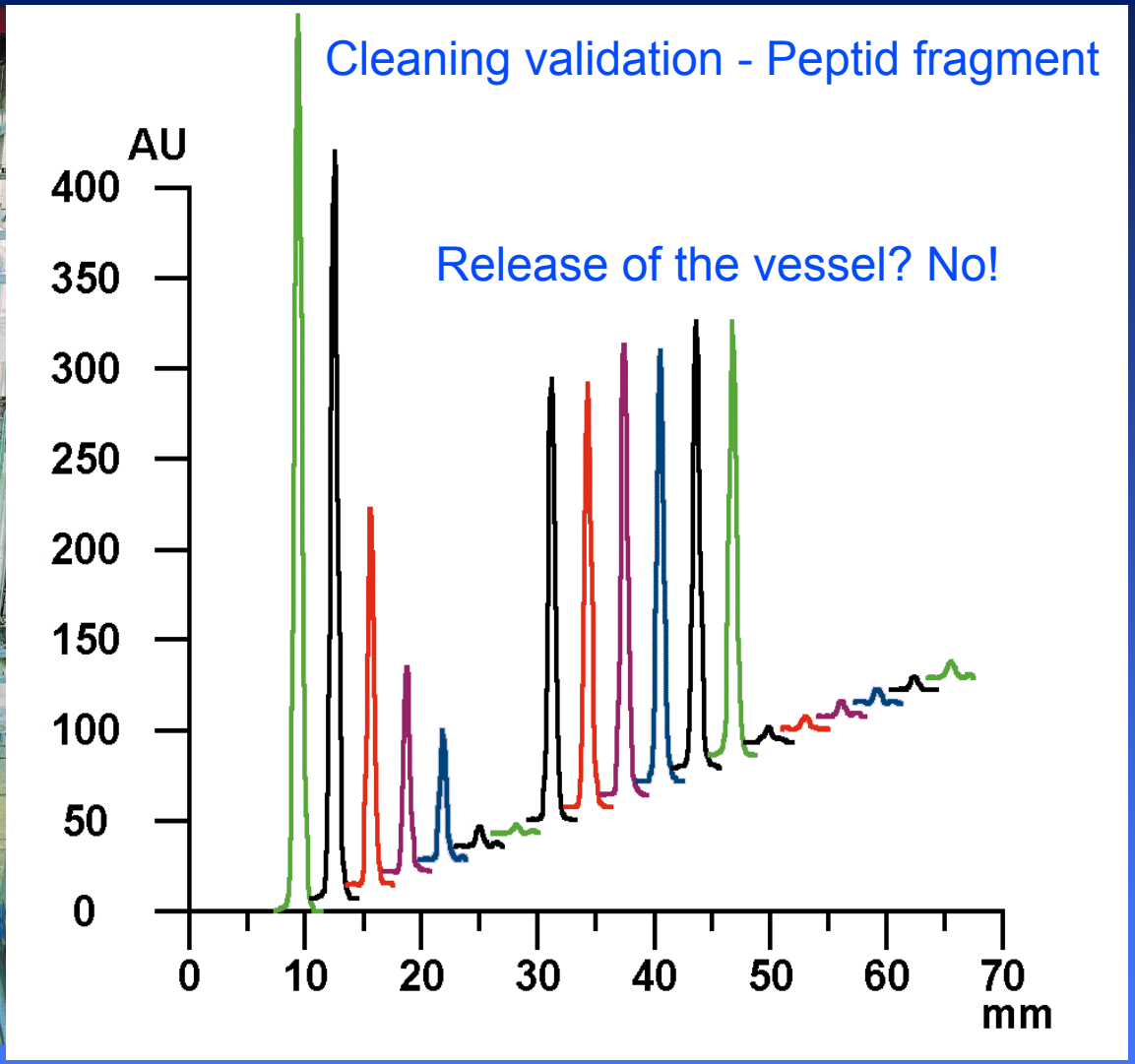
Indol alkaloids in tissue cultures of Vinca rosea



- **50 samples in 2 h (factor of 10 more rapid than HPLC)**
- **LOD 0,5 ng and 2 ng, resp. (factor of 10 more sensitive than HPLC)**
- **150 µL solvent per sample**

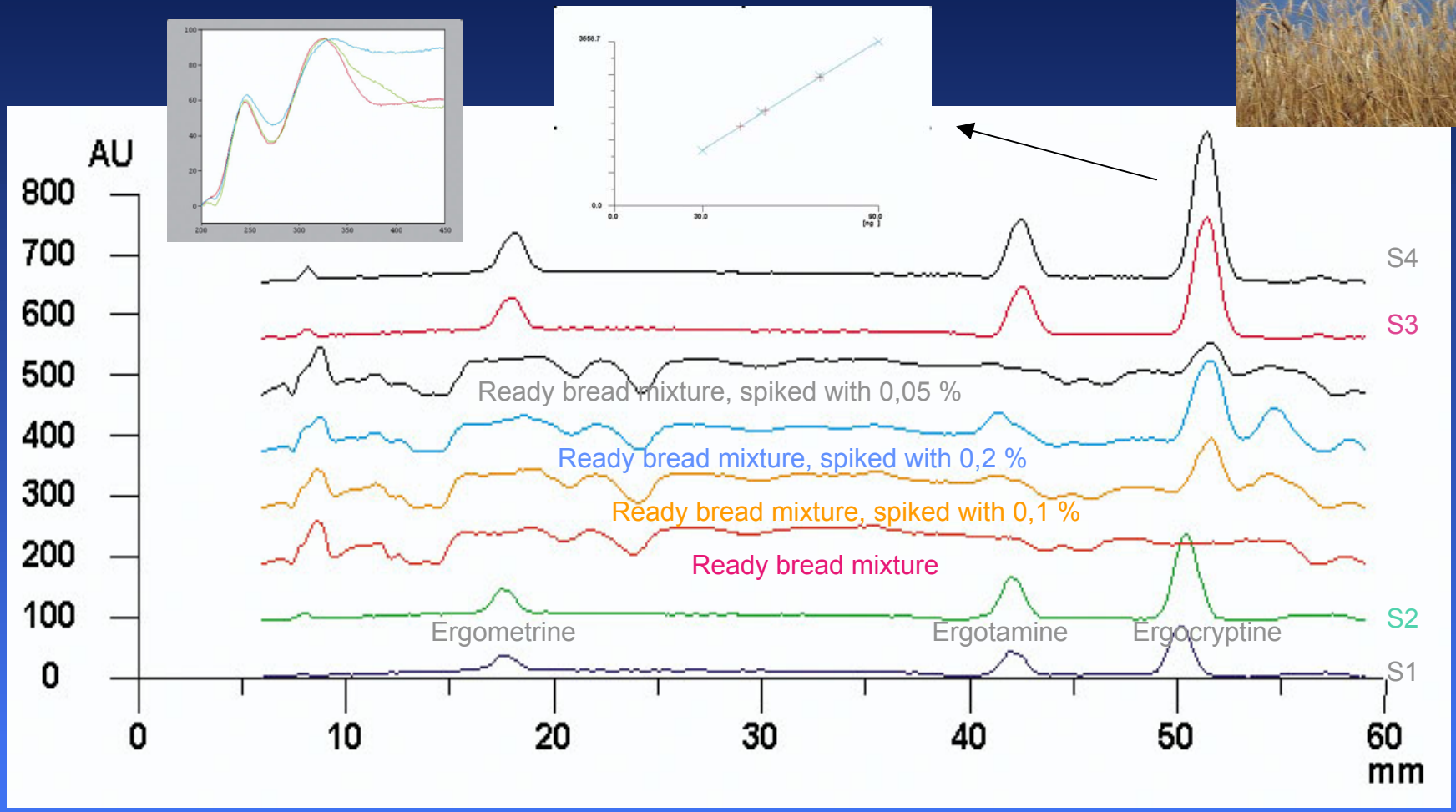
J. Creche et al., University of Tours, see CBS 90

Rapid, sensitive and cost-effective



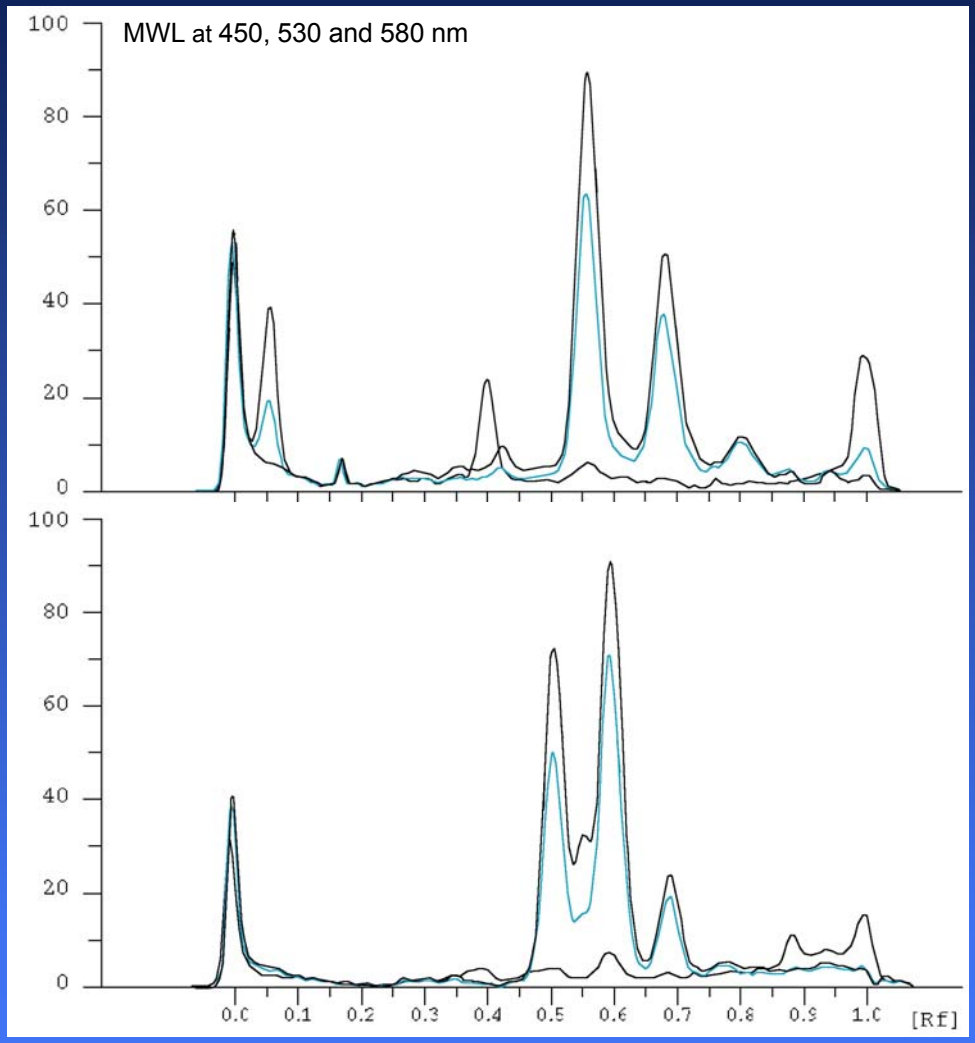
A. Meichtry et al., Lonza AG, Visp, Switzerland, see CBS 85

Screening of ergot alkaloids in grain, flour, and bread

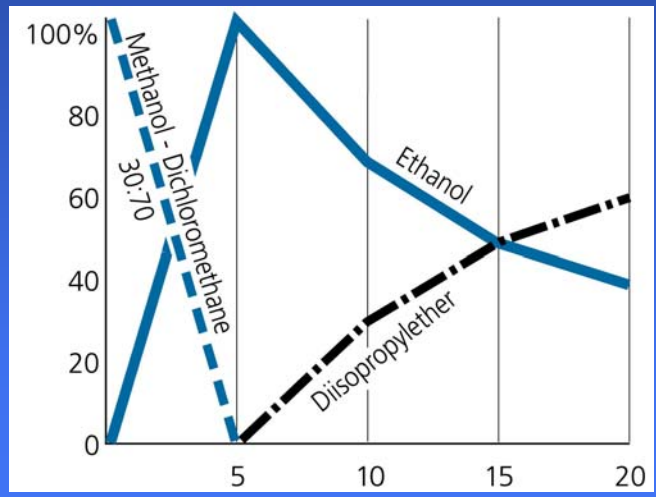


W. Ternes et al., Center of Food Science, Vet. School, Hannover, see CBS 82

Screening of ball pen inks



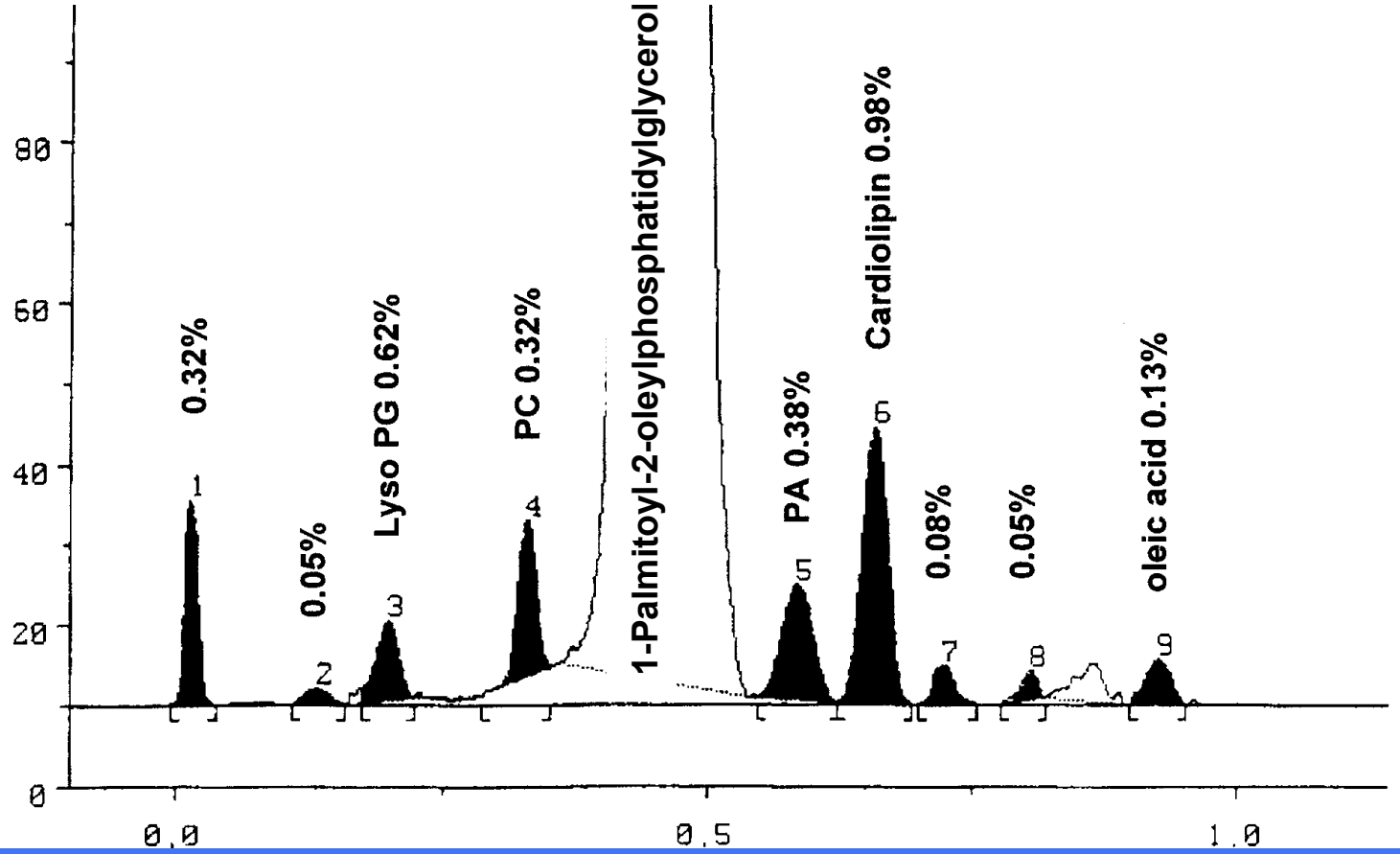
- Product classification
- Determination of document age



F. Köhler, P. Seiler, Bundeskriminalamt, Wiesbaden, see CBS 74

Rapid, sensitive and cost-effective

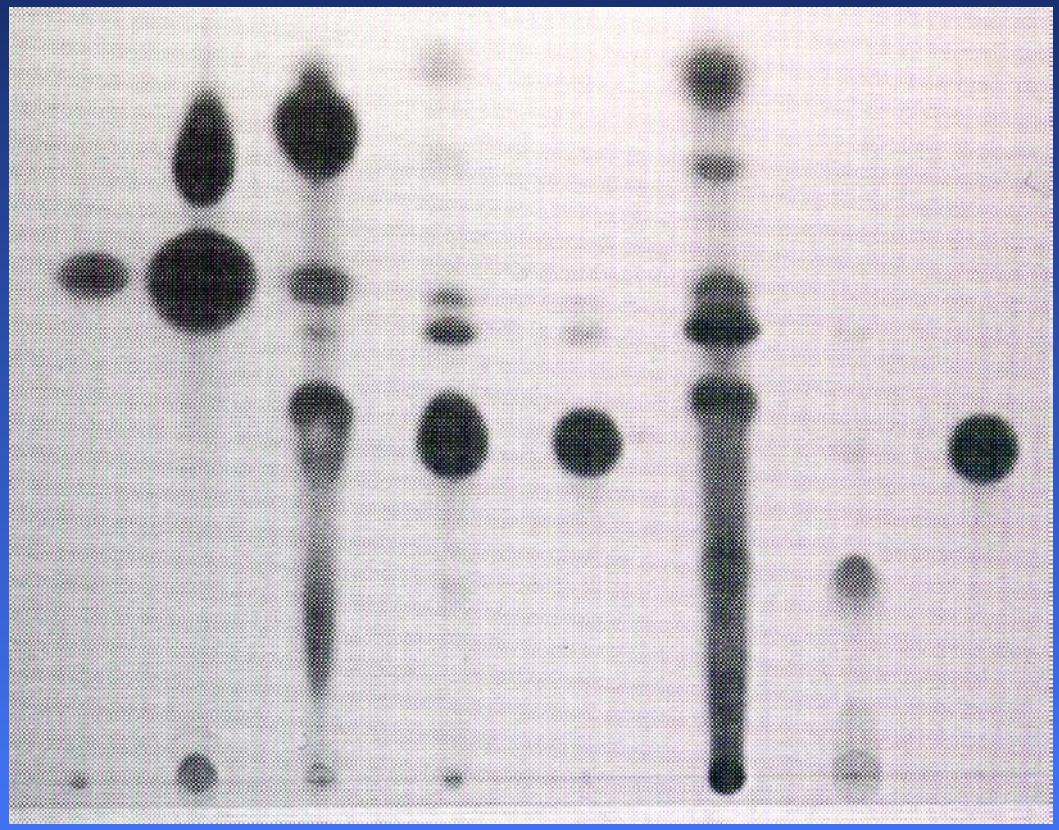
Benchmarking - more cost-effective by a factor of 2,5 compared to HPLC



B. Renger et al., Byk Gulden, Konstanz, see CBS 81

The most convenient way

Monitoring of synthesis



Hahn-Deinstrop, E.: Applied Thin-Layer Chromatography. Best practice and avoidance of mistakes, 2000, Wiley-VCH, Weinheim, ISBN 3527-298398.

More effective than in reaction vessels

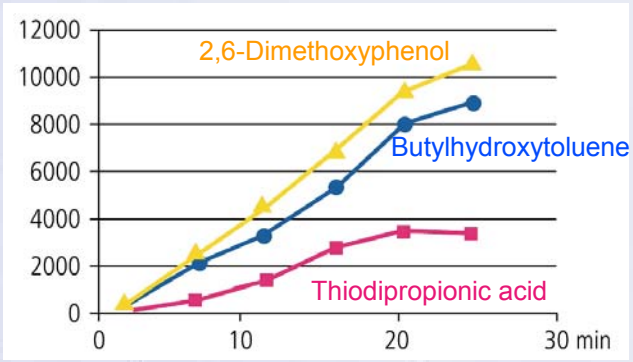
Potency of antioxidants of natural origin

Group 1 | Group 2 | Group 3 | Group 4 | Group 5 | Group 6

B BHT U1 U2

Start: Overspraying of a group with ß-carotin solution (kinetic time intervall 4,5 min)
Stop: Overspraying of all groups with conc. BHT solution

→ ß-Carotine is chromatographed (1 min) out of starting zone (reaction zone), absorption measurement at 442 nm

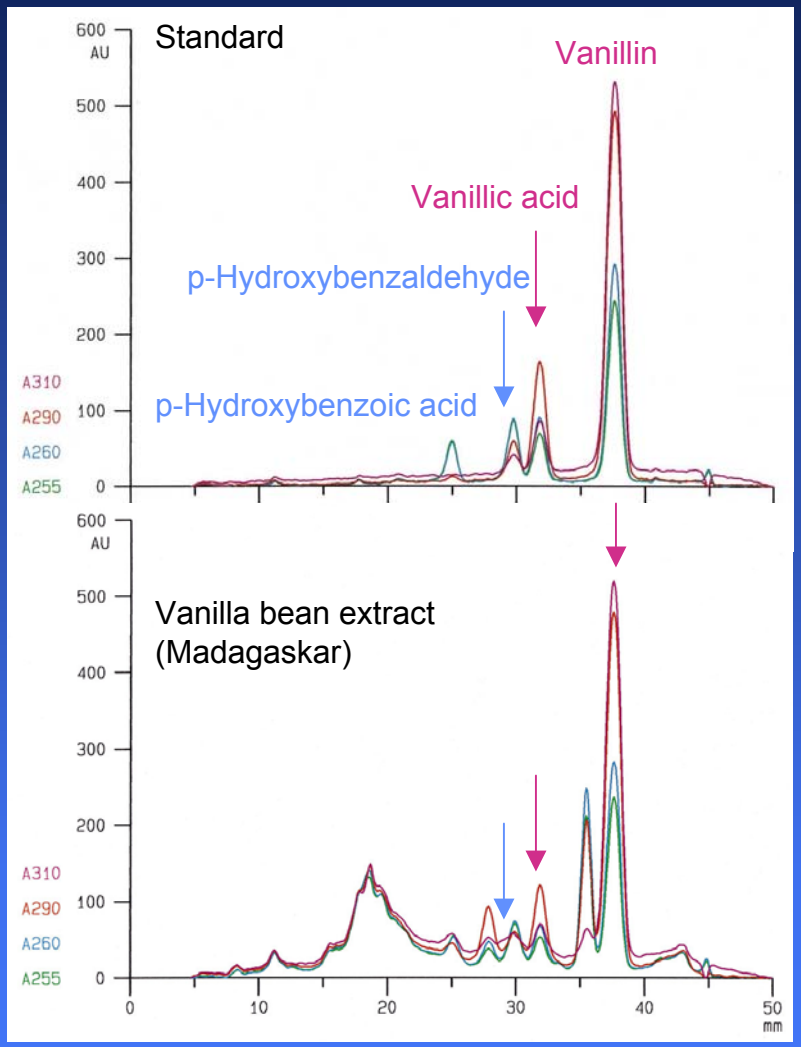


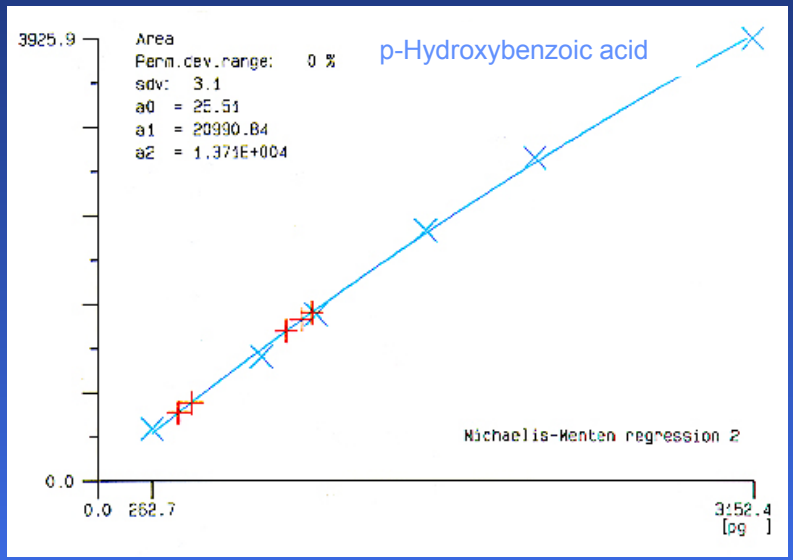
Potency relative to BHT:

- TBHQ 13
- BHA 5
- Laurylgallate 2
- Ascorbylpalmitate 2
- (+)-Catechine 1
- Ascorbinic acid 4/5
- Gewürznelkenöl 1/3
- Rosmarin Oleoresin 1/14
- Rutin 1/17
- N-Acetyl-L-Cystein 1/33
- Grapefruit dest. residue 1/50
- Limetten dest. residue 1/250

M. Calandra et al., Firmenich, Princeton, NJ, USA, see CBS 87

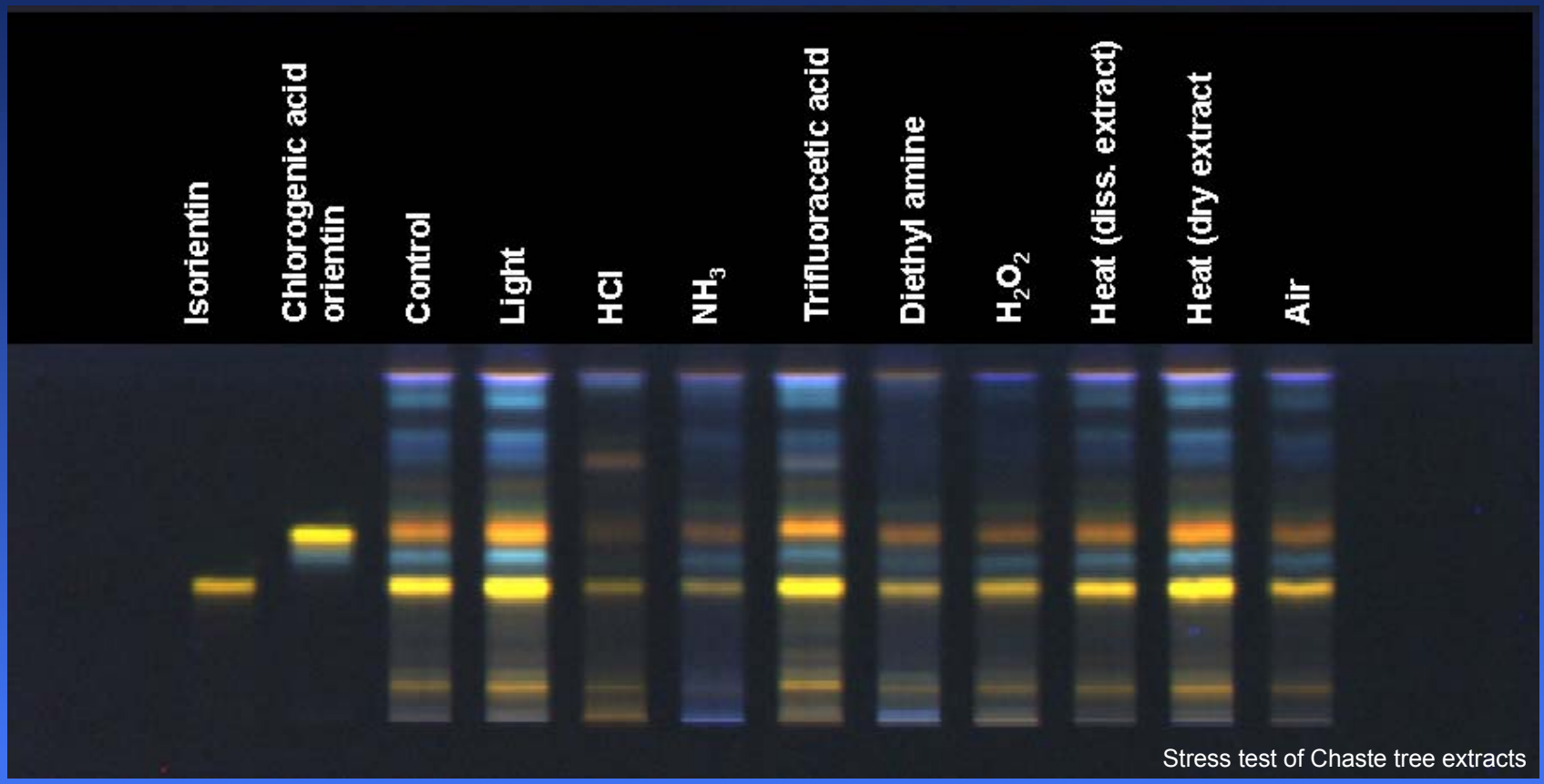
High throughput, low-cost, robust analsis





S. Lavoine et al., Studio de Creation de Parfumerie, Mourgins cedex and Biolandes, Labrit, see CBS 81

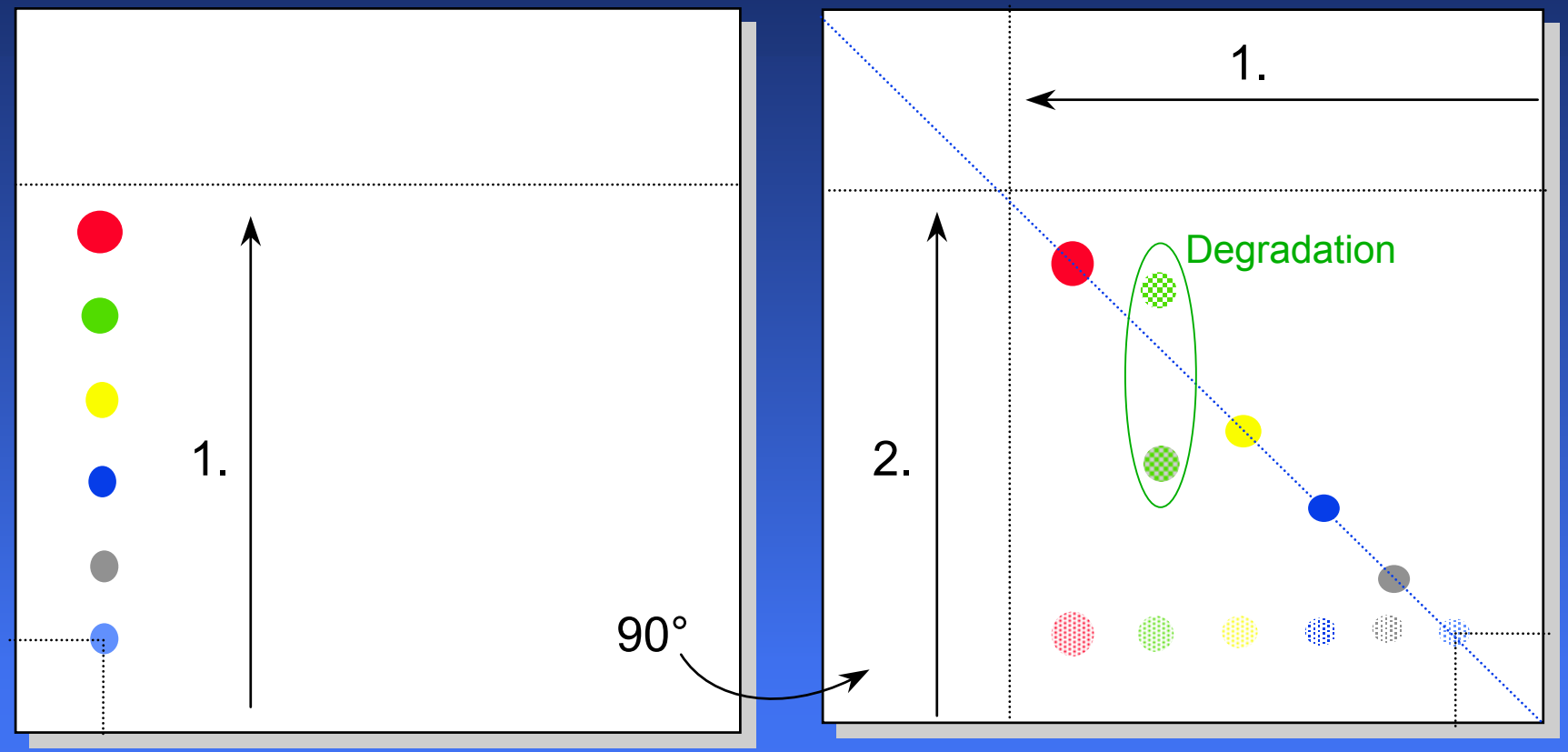
All information at first glance!



F. Wahli, diploma thesis, Inst. of Pharm. Biology, Univ. of Basel, 2002, see CBS 91

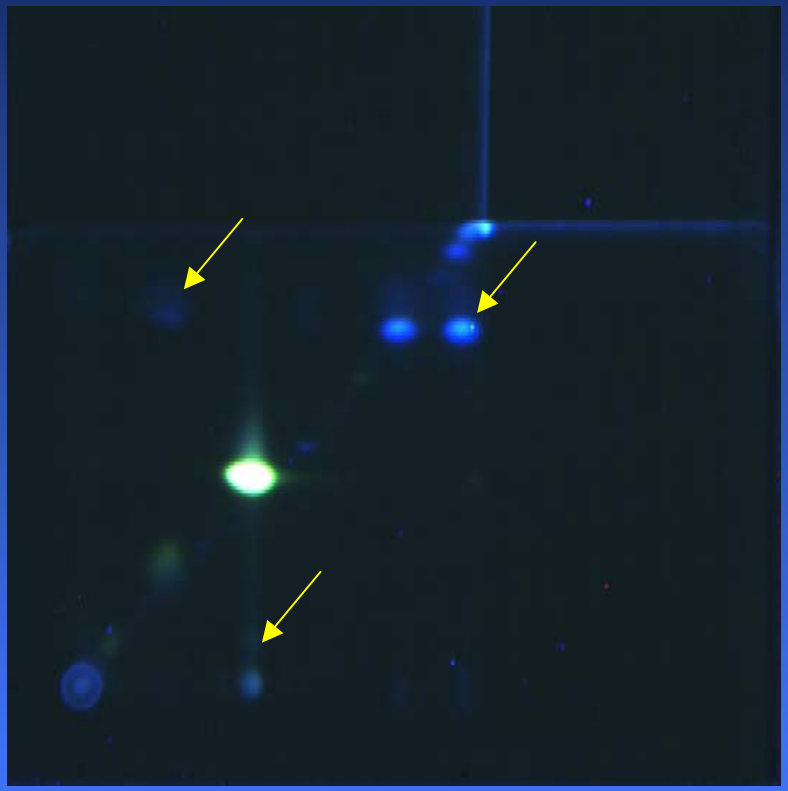
Stress test

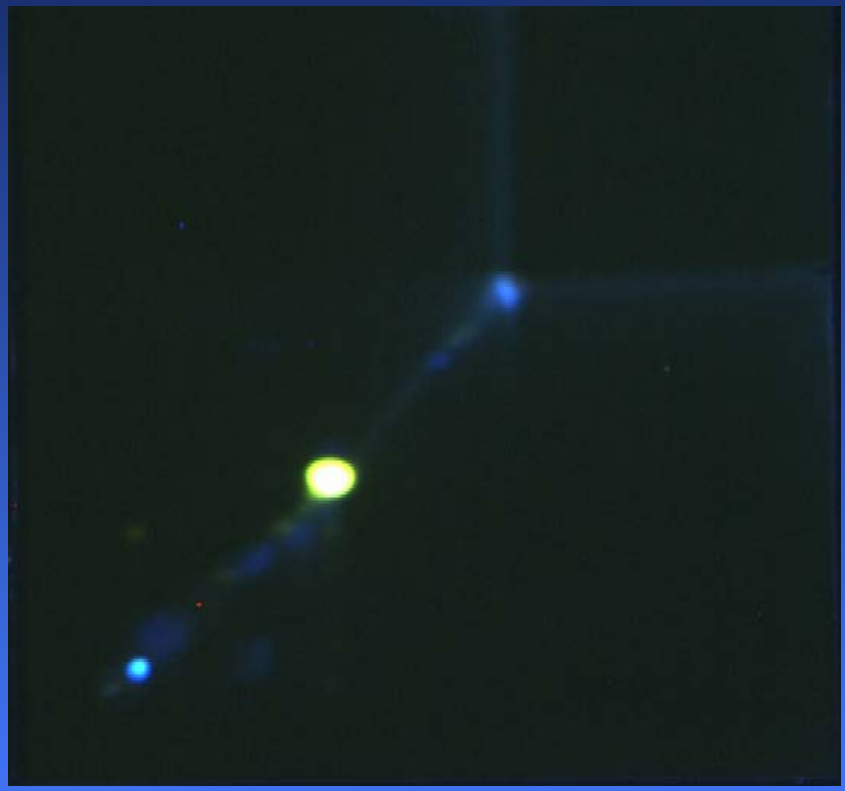
2-D separation with intermediate reaction



... with the same solvent, plate turned by 90°

Alkaloids in Golden seal

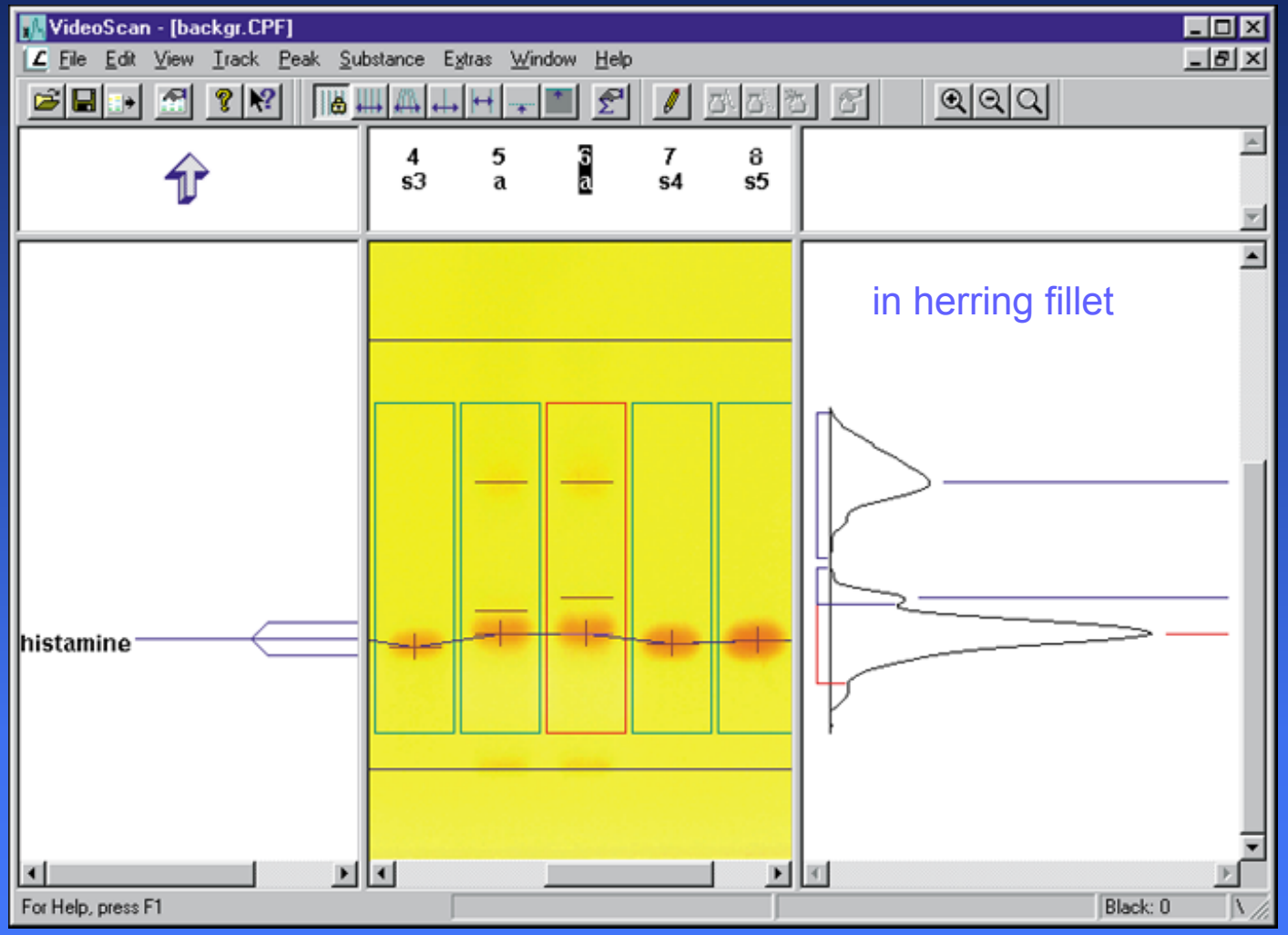




CAMAG Laboratory

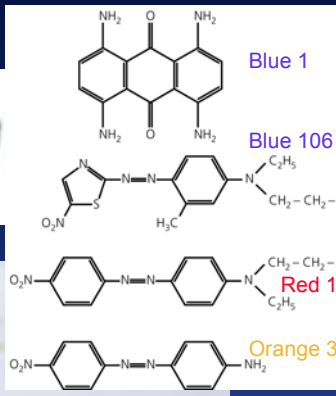
All information at first glance... and click!

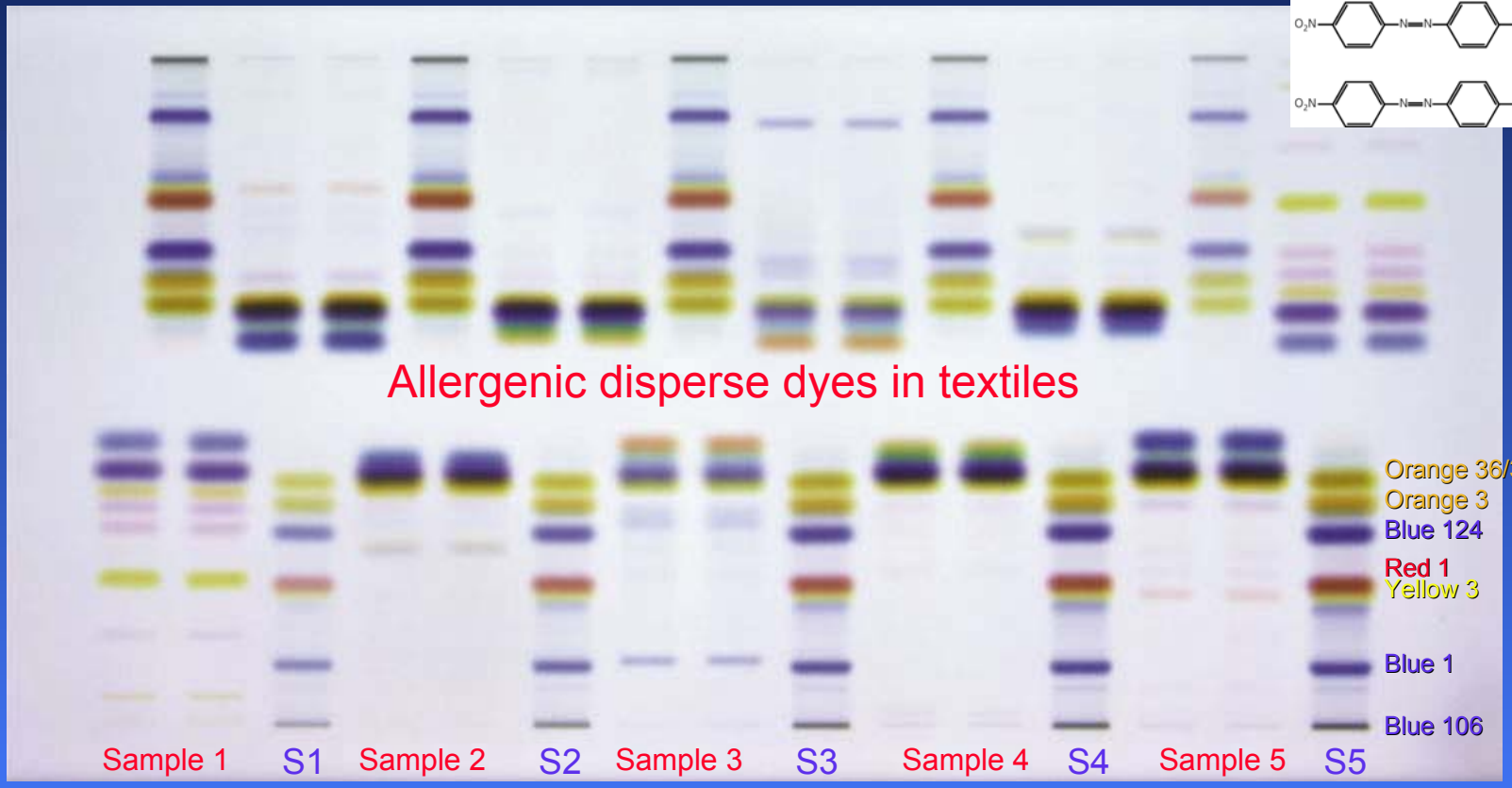
Histamine in fish and fish products



M. Steyke et al., IVPT, Berlin, see CBS 83

Effective screening

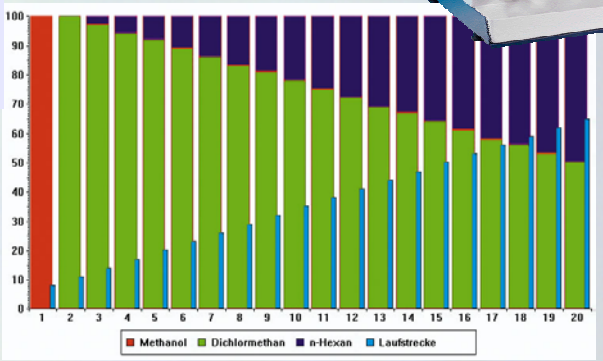




A. Bonhoff et al., STR Testing & Inspection AG, Steinach, Switzerland, optimized at CAMAG Laboratory, see CBS 82

...and even cost effective confirmation

Allergenic disperse dyes in textiles



mit Orange 3

ohne Orange 3

Orange 3

Orange 36/37

Blue 124

Red 1

Yellow 3

Blue 1

Blue 106

Sample 1

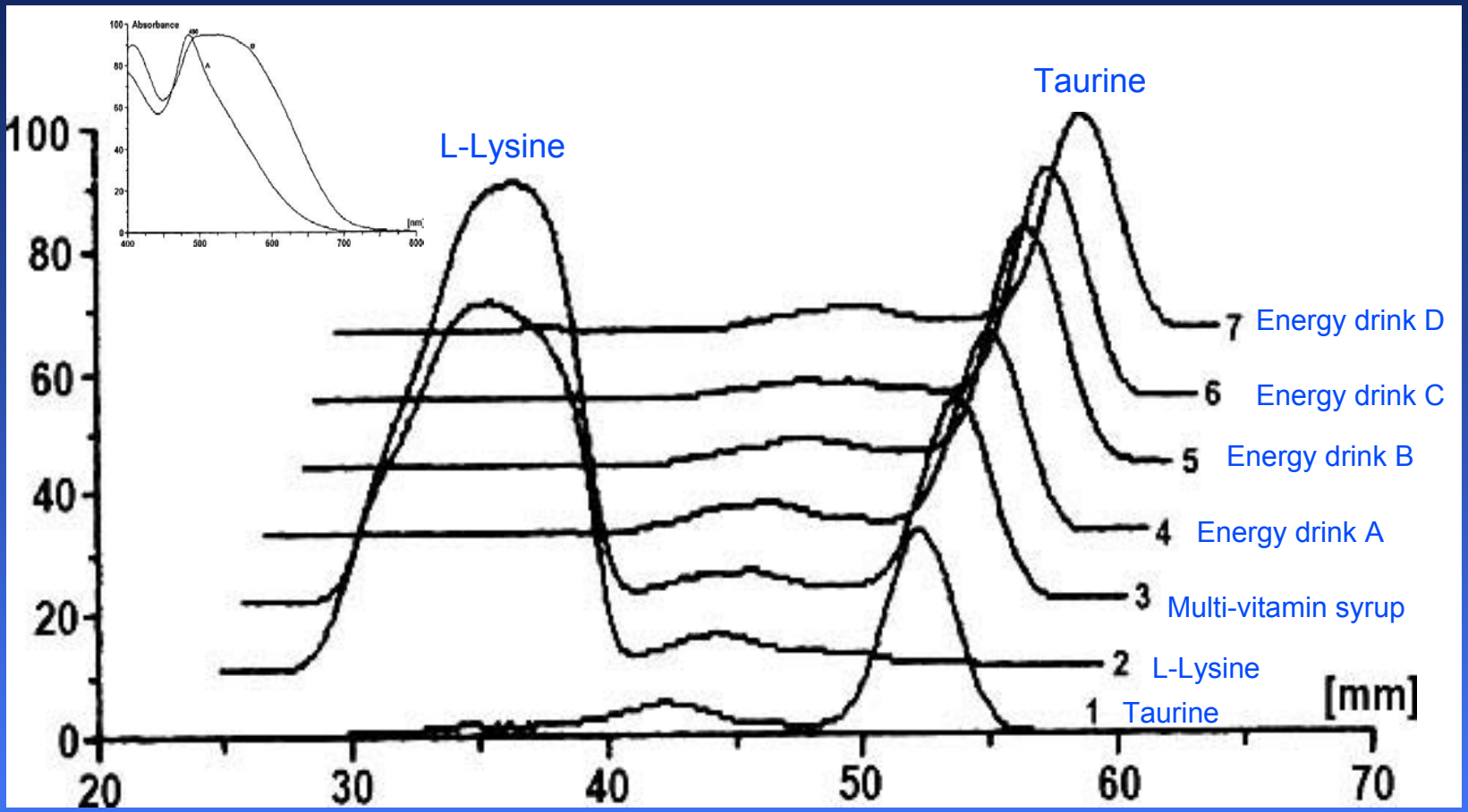
Sample 2

Sample 3

Sample 4

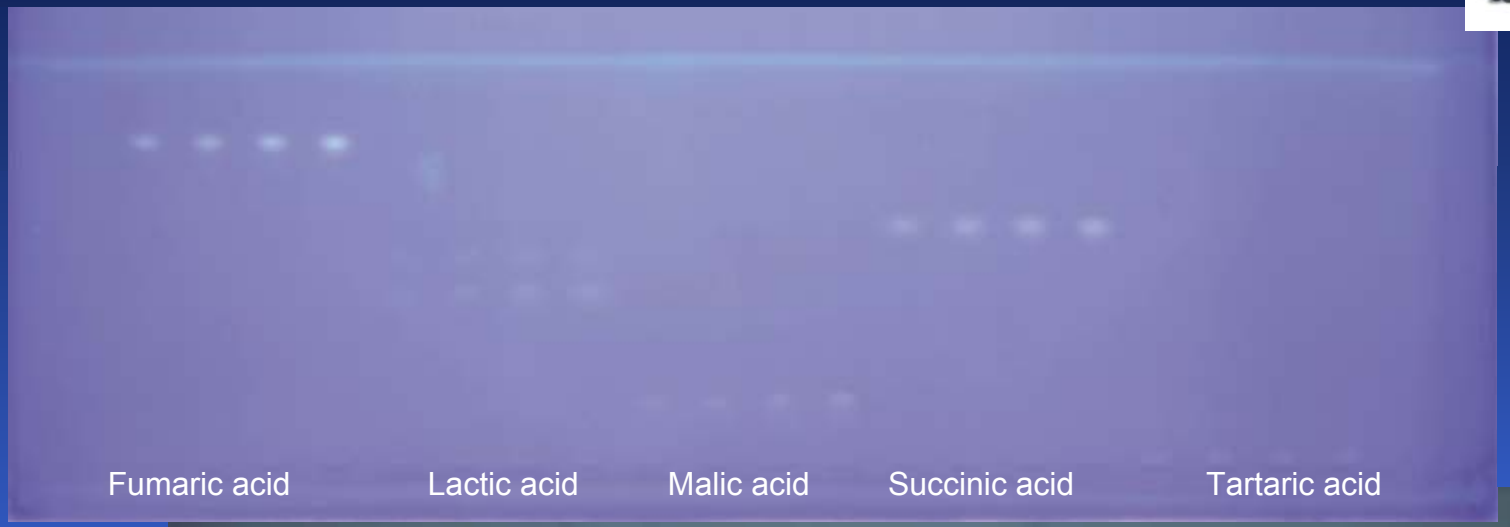
Sample 5

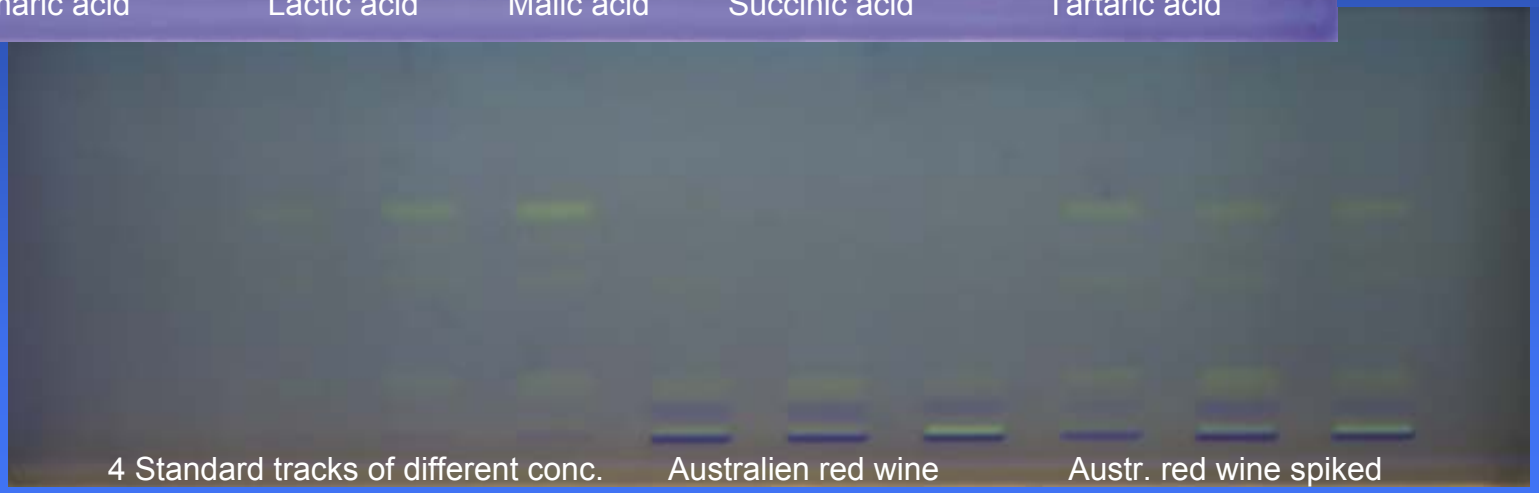
Clever method



G. Indrayanto et al., University of Airlangga, Indonesia, see CBS 90

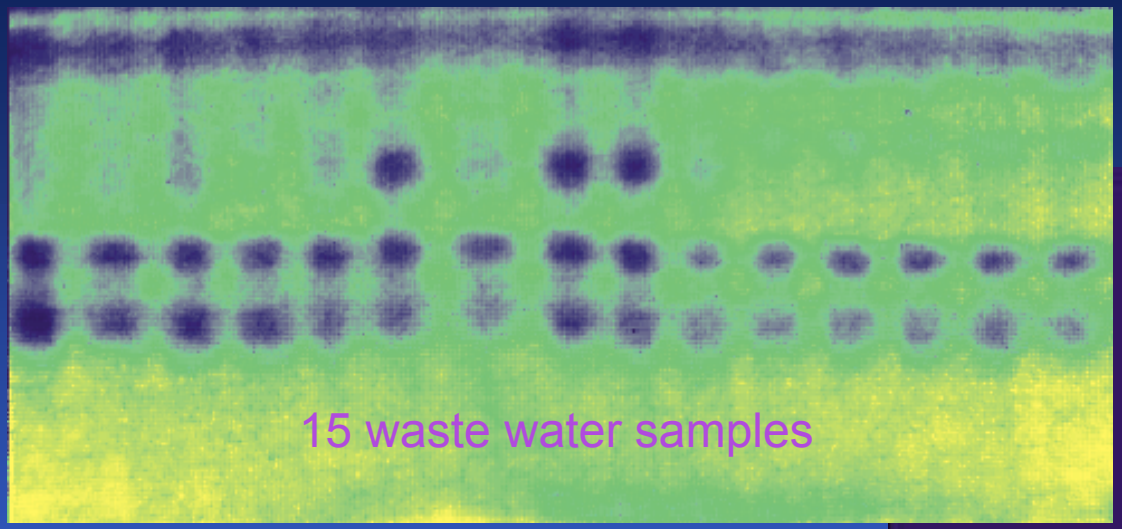
As simple as possible ...organic acids in wine

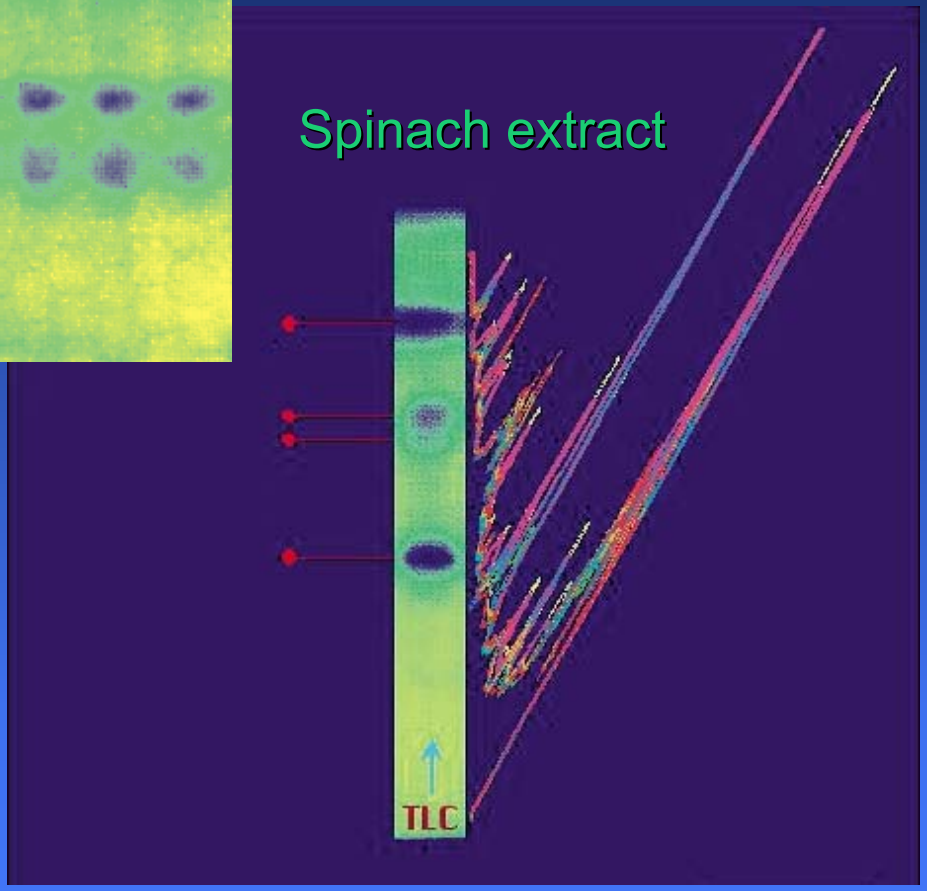




Boido et al., JPC 4 (12) 1999, 269-271, optimized at CAMAG Lab, see CBS 84

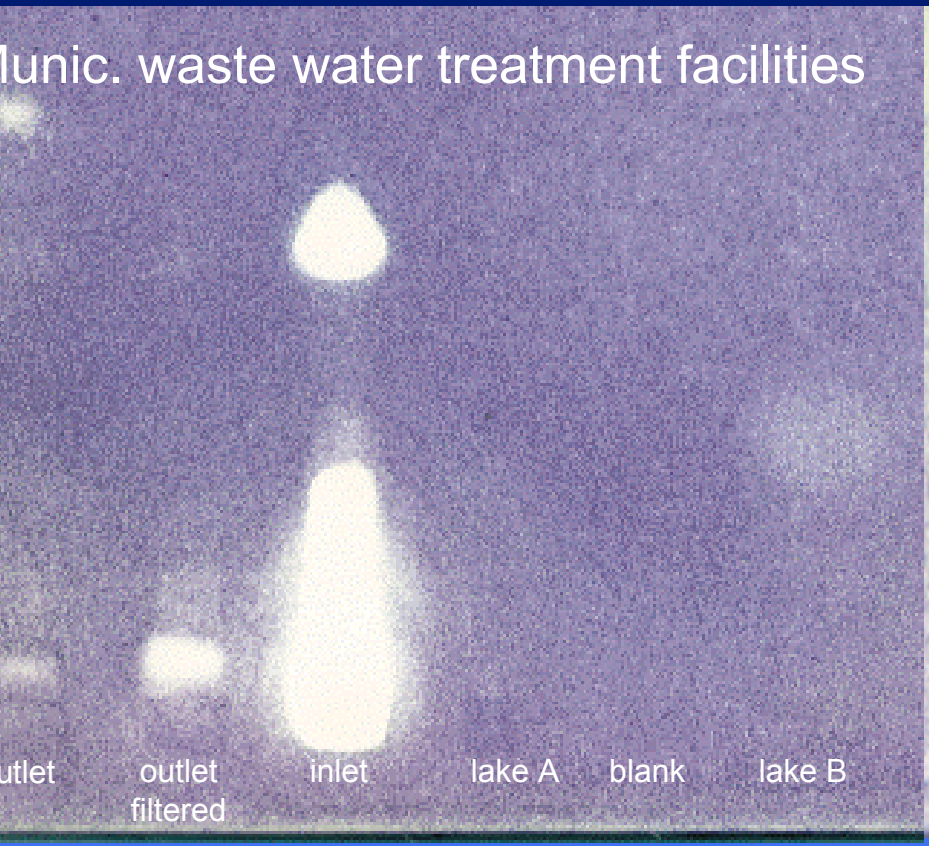
Biomonitoring of toxic compounds



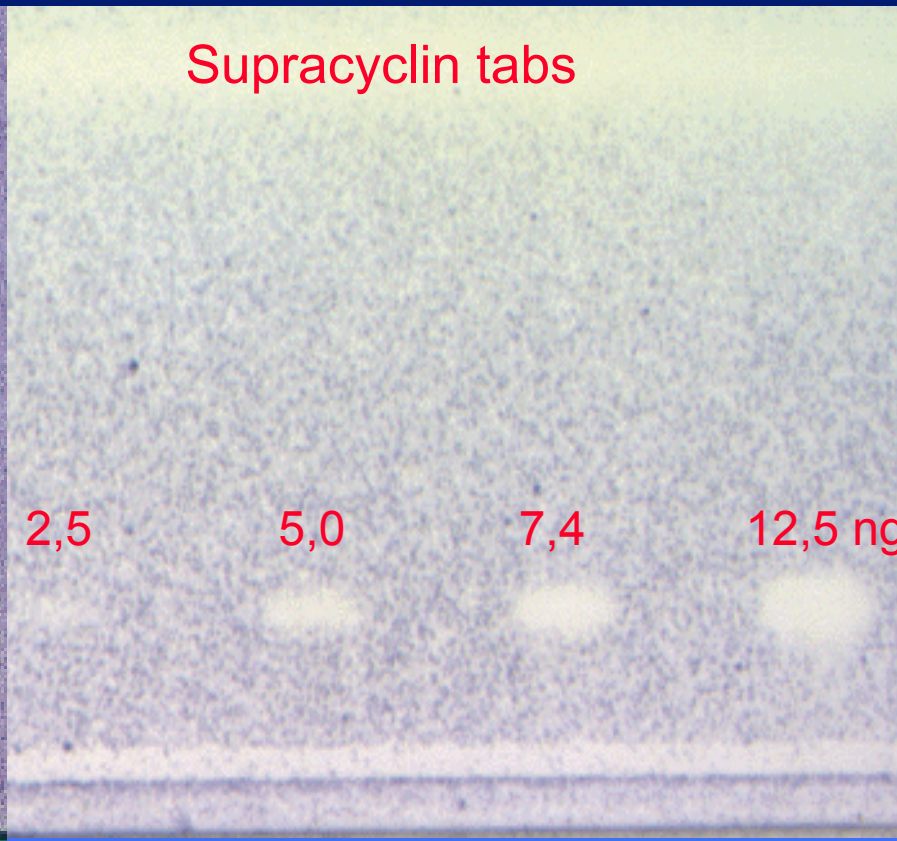


W. Kreiss et al., Bayer AG,
Chroma Dex Test Kit “BiolumineX“, see CBS 88

Biomonitoring of antibiotics

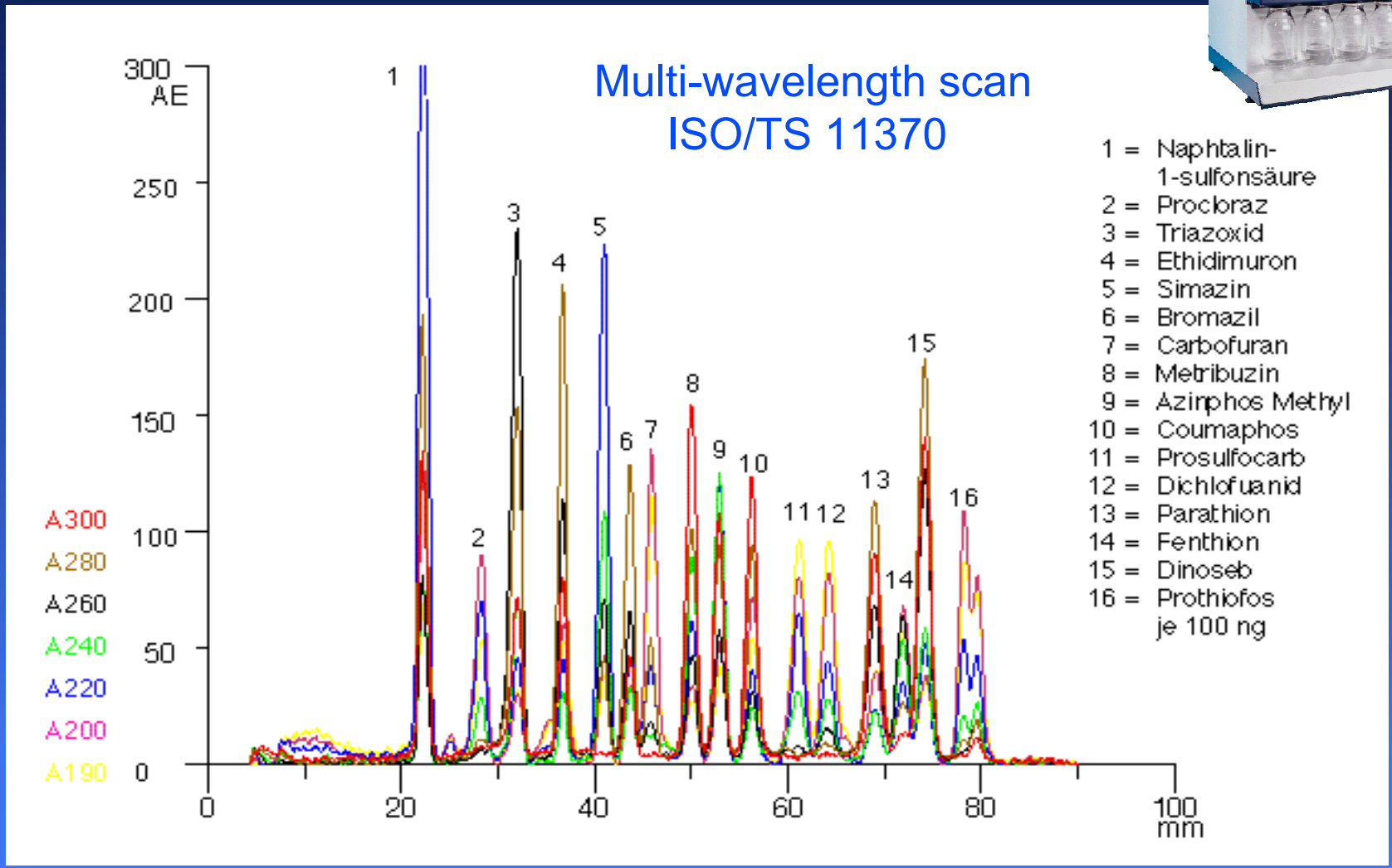


C. Weins, Staatl. Inst. für Gesundheit und Umwelt, Saarbrücken



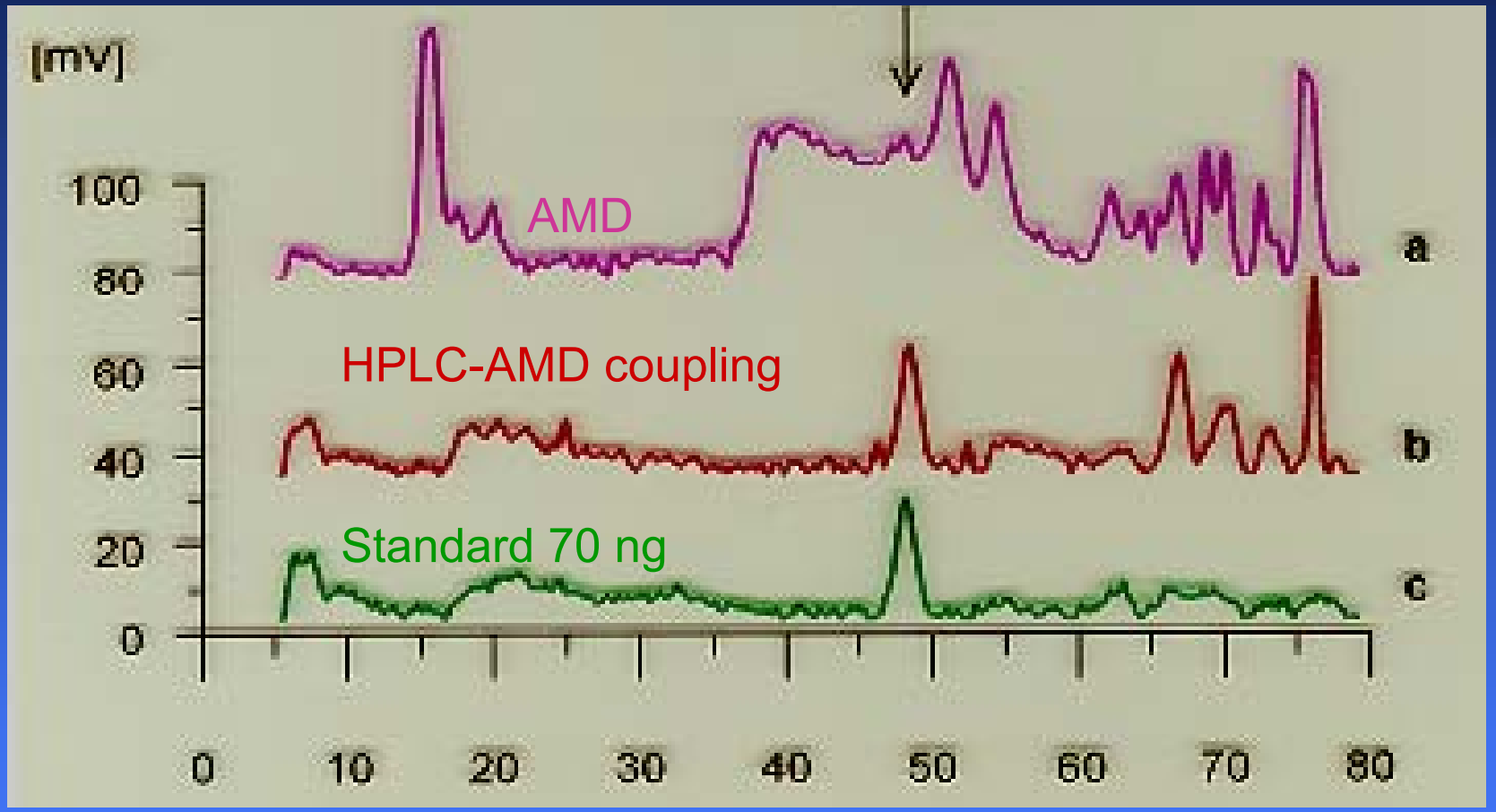
Merck Bioautographic Test Kit „Chrom Biodip®“, see CBS 85

Pesticides in drinking and surface water



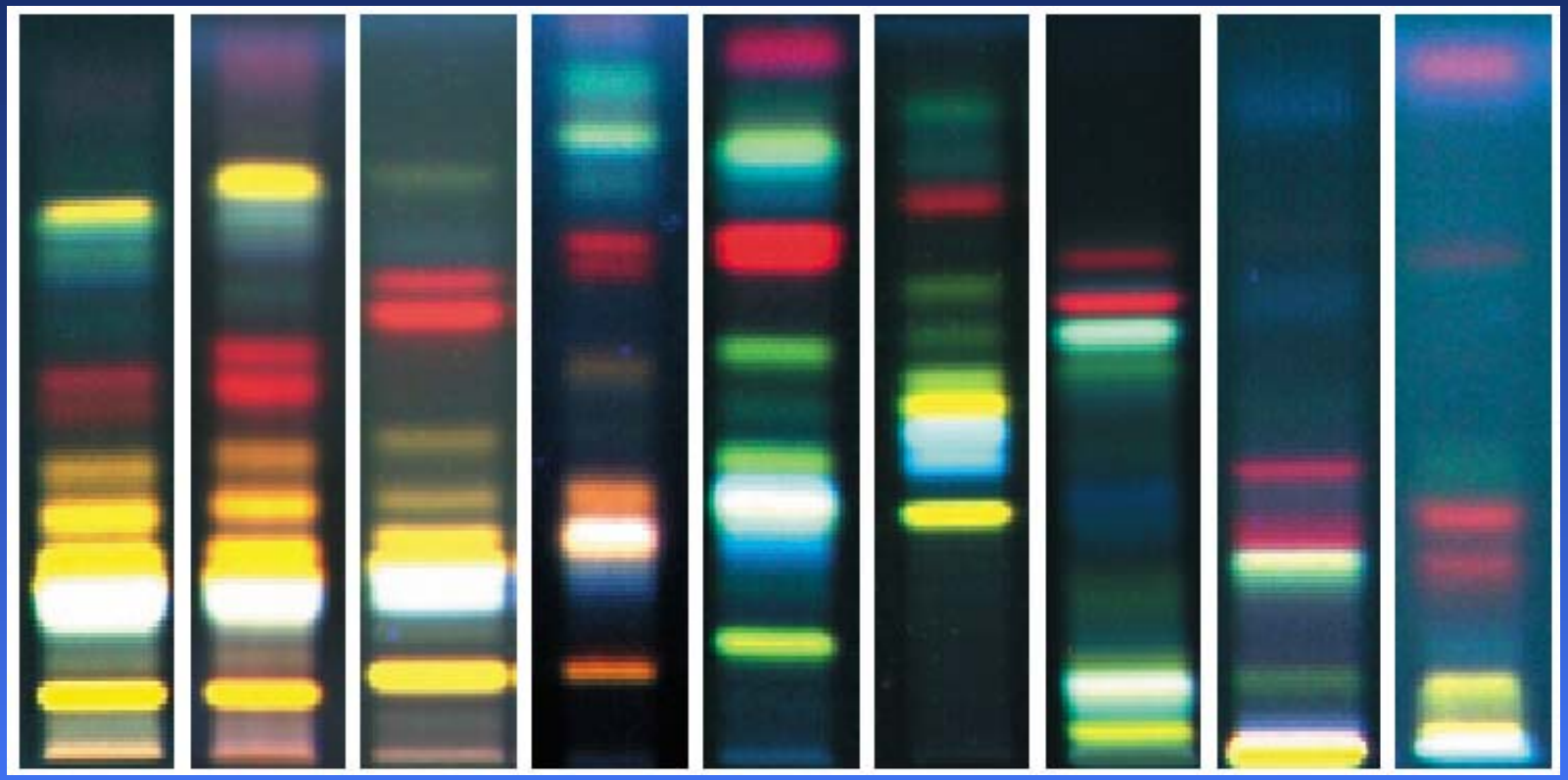
klaus.burger@mail.isis.de

Iprodione in lettuce



U. Wippo, H.-J. Stan,
Deutsche Lebensmittel-Rundschau 5, 144-148 (1997)

Solvents

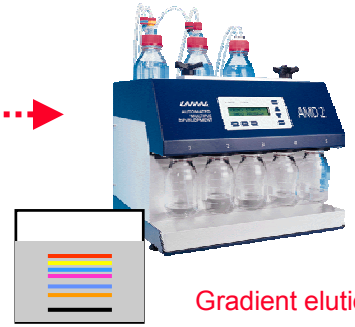


CAMAG CBS

Planar Chromatography

Fully automatic application

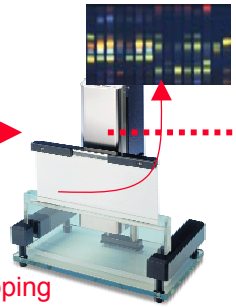
Half automatic application



Gradient elution

Fully automatic chromatography

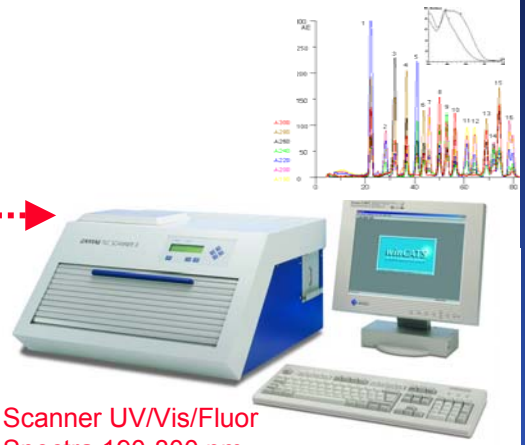
Horizontal development



Dipping

Spraying

Heating



Scanner UV/Vis/Fluor
Spectra 190-800 nm

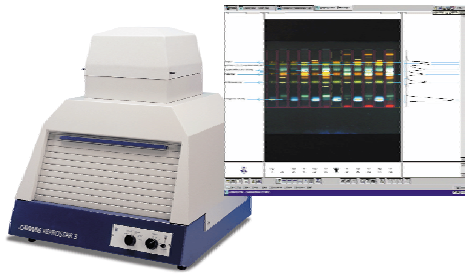


Image documentation
Video densitometry

Application Chromatography Derivatization Evaluation

Why people prefer planar chromatography

Normal phase chromatography

Minimal sample preparation

No ma

Rapid

All inf

Cost e

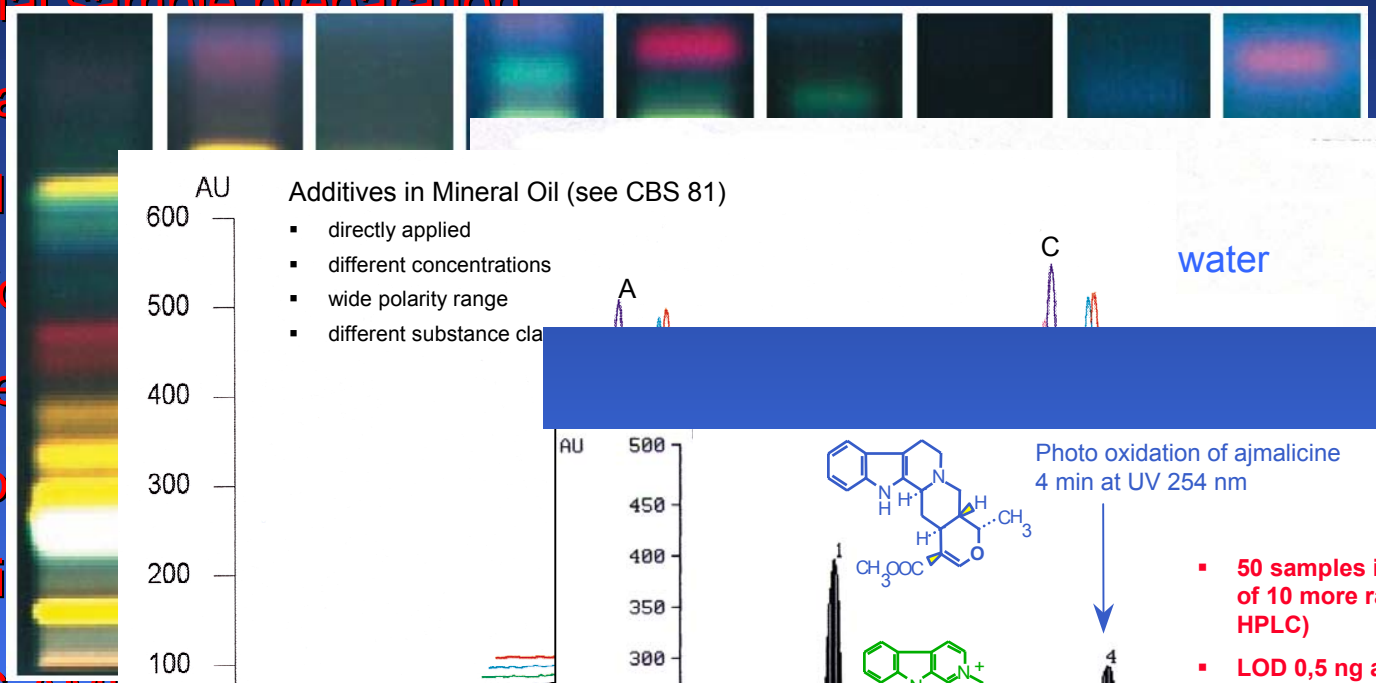
Flexib

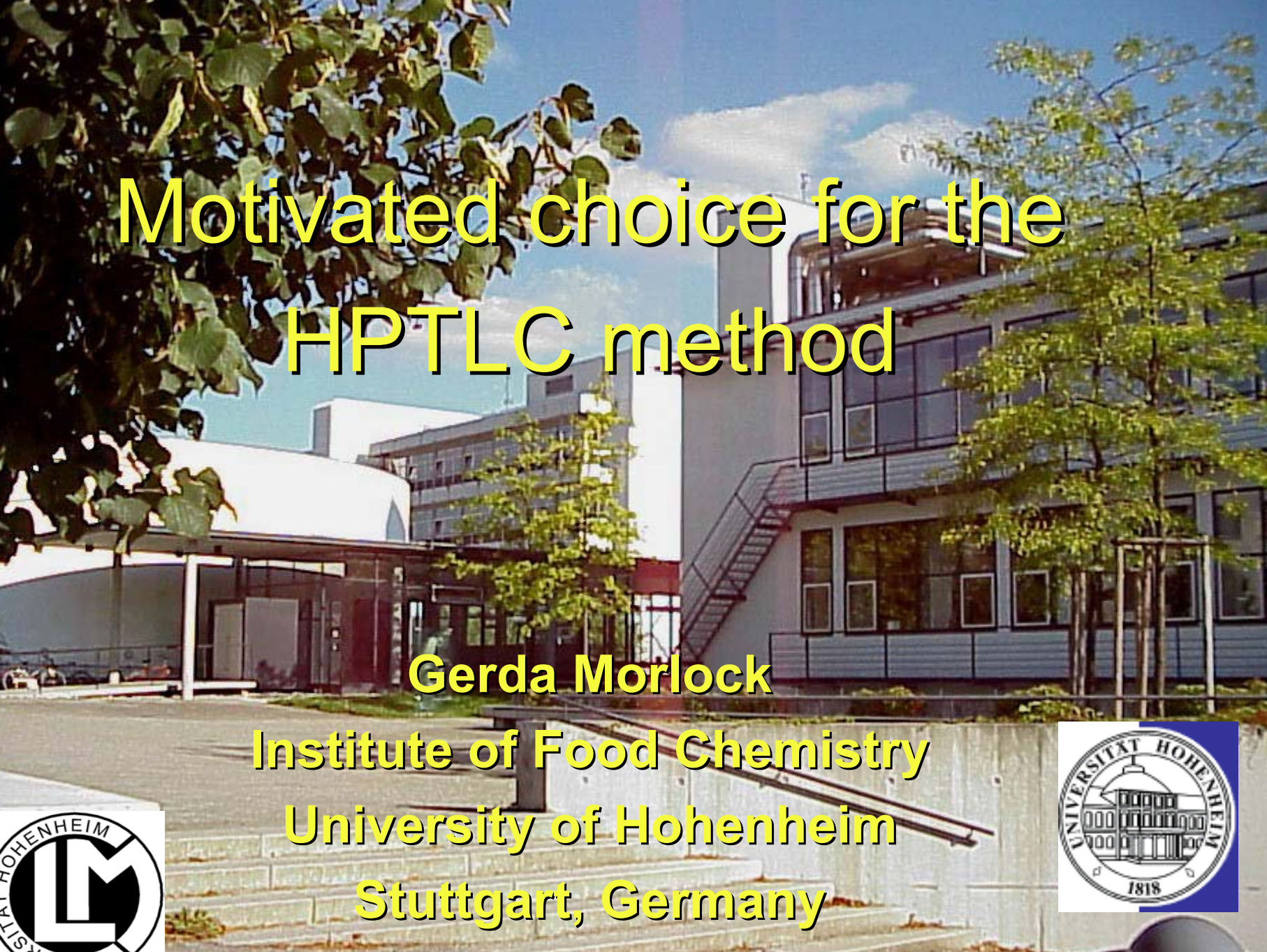
Toxici

HPLC-AM

Flexibility,

Know how

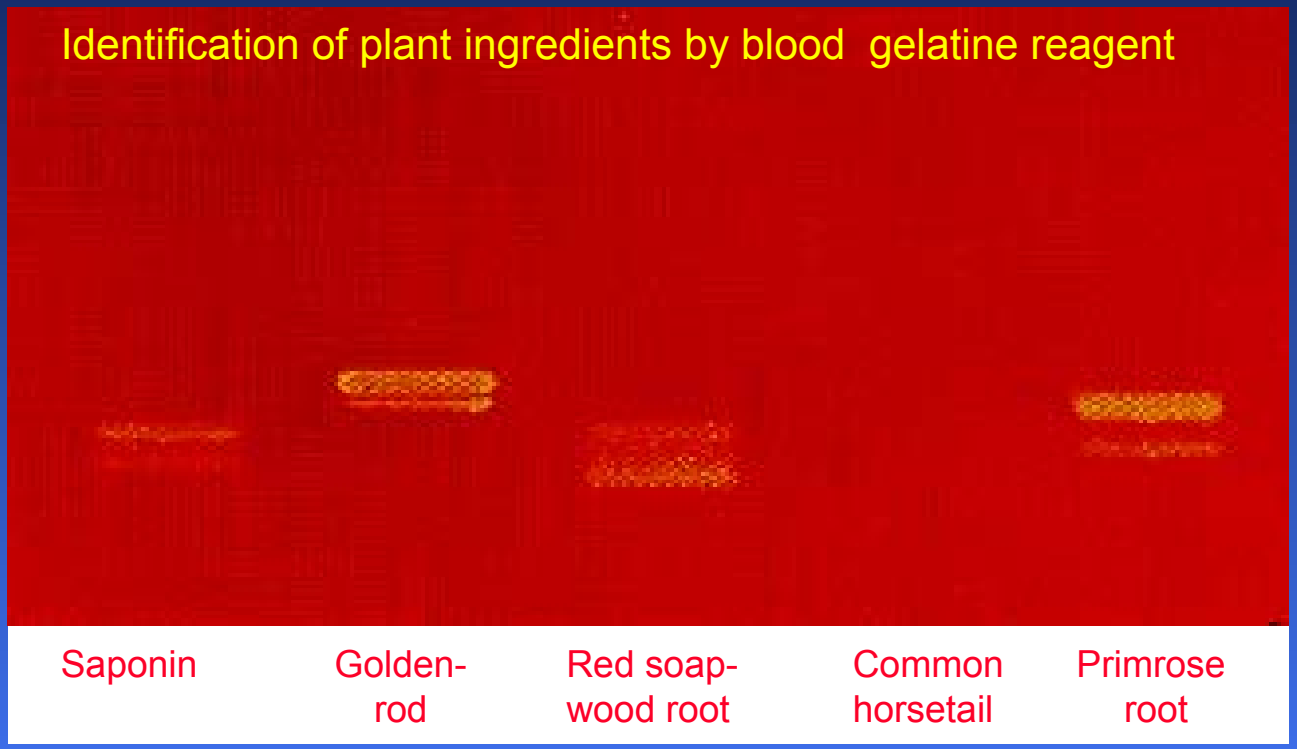




Motivated choice for the HPTLC method

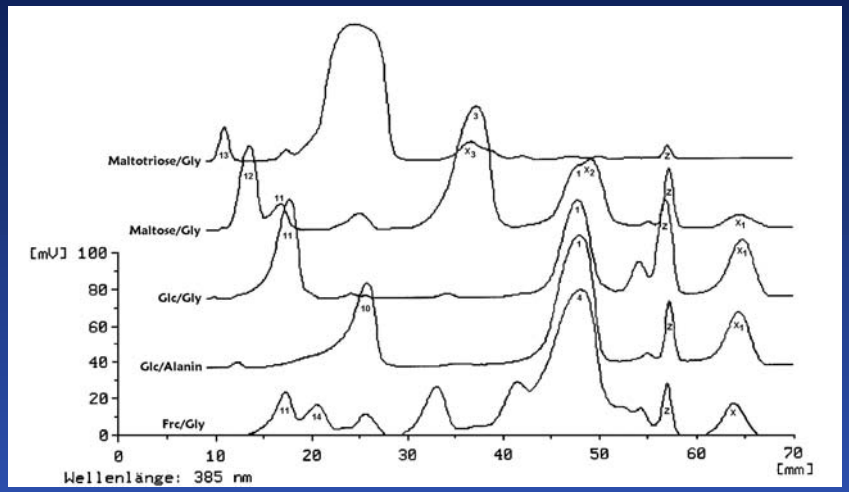
Gerda Morlock
Institute of Food Chemistry
University of Hohenheim
Stuttgart, Germany

Biomonitoring of saponins



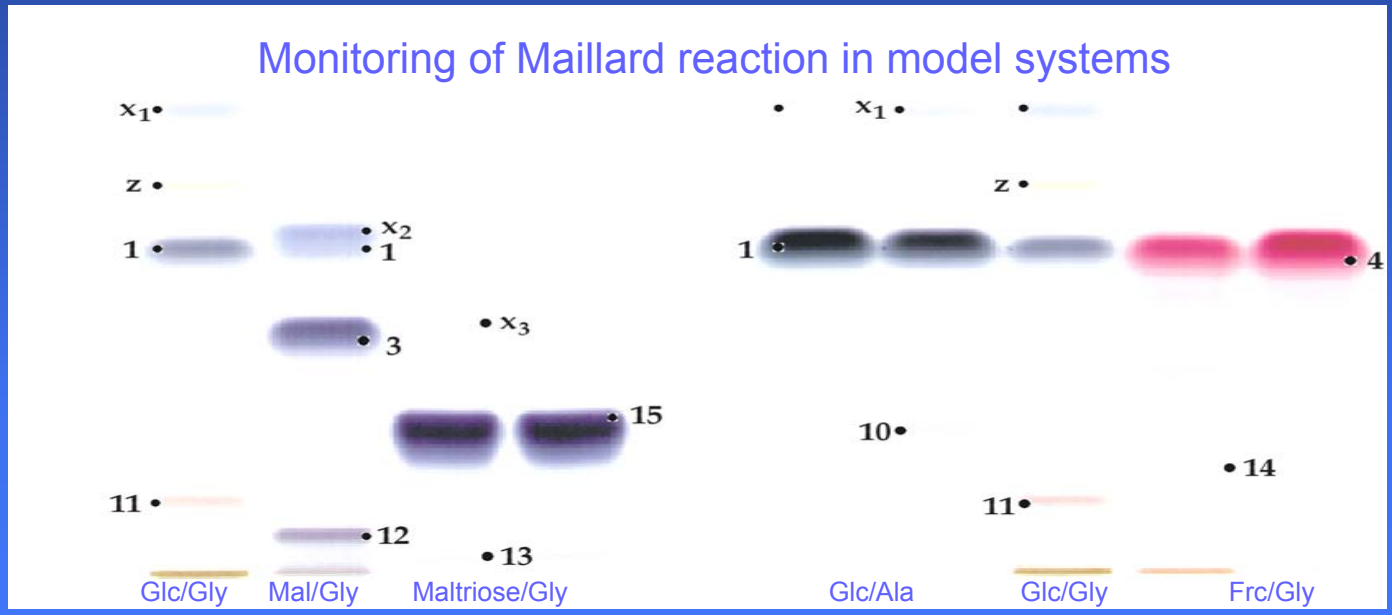
Hahn-Deinstrop, E.: Applied Thin-Layer Chromatography. Best practice and avoidance of mistakes, 2000, Wiley-VCH, Weinheim, ISBN 3527-298398.

Effectiv analysis of carbohydrates



1 = D-Glucose
3 = Maltose
4 = Fructose
10, 11, 12, 13 = Amadori compounds
14 = Heyns compounds
15 = Maltooligosaccharides

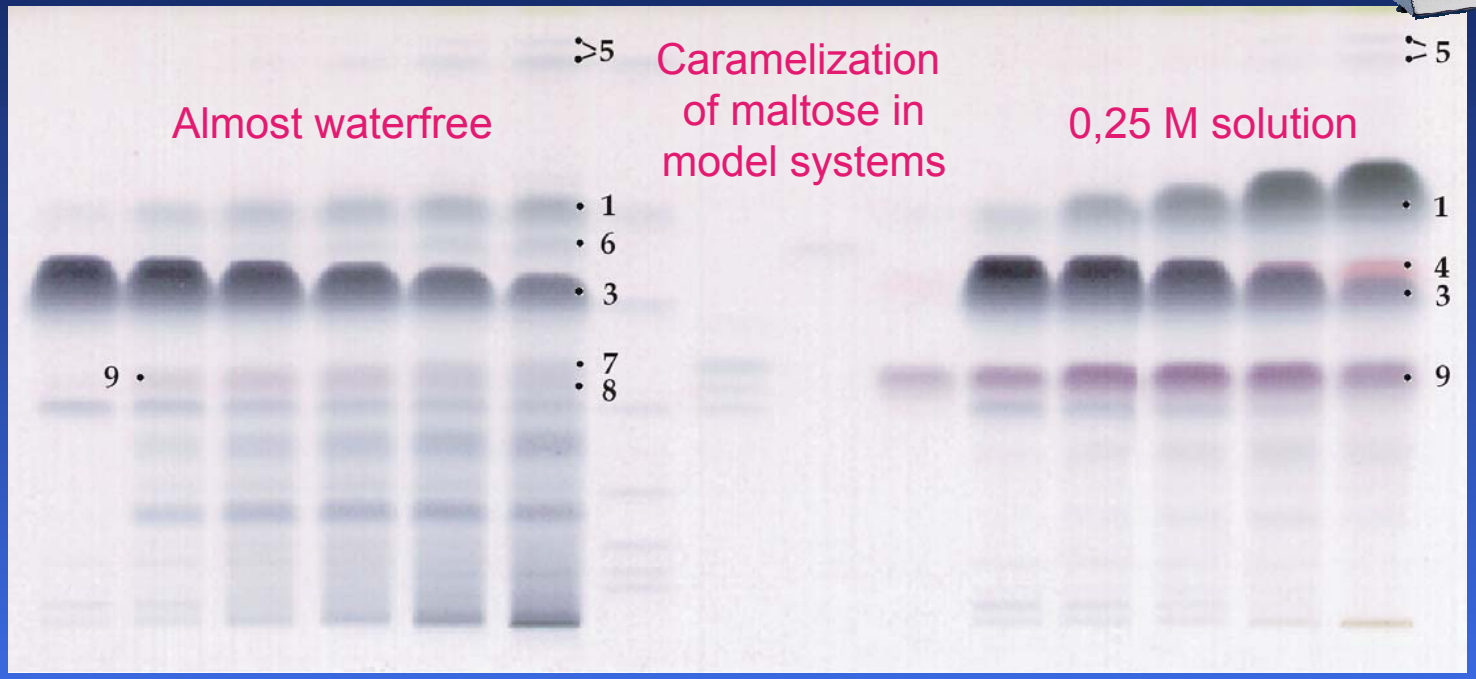
Monitoring of Maillard reaction in model systems



Application of effluent from HPLC

- Special application device called DuoChrom
- Flow rate 100 µL/min for methanol (40 µL/min for methanol - water 3:7)
- Average cut time 1-2 min, delay time 2 - 600 s
- Application as rectangles/area
- Spray-on technique with heated spray nozzle allows higher flow rates

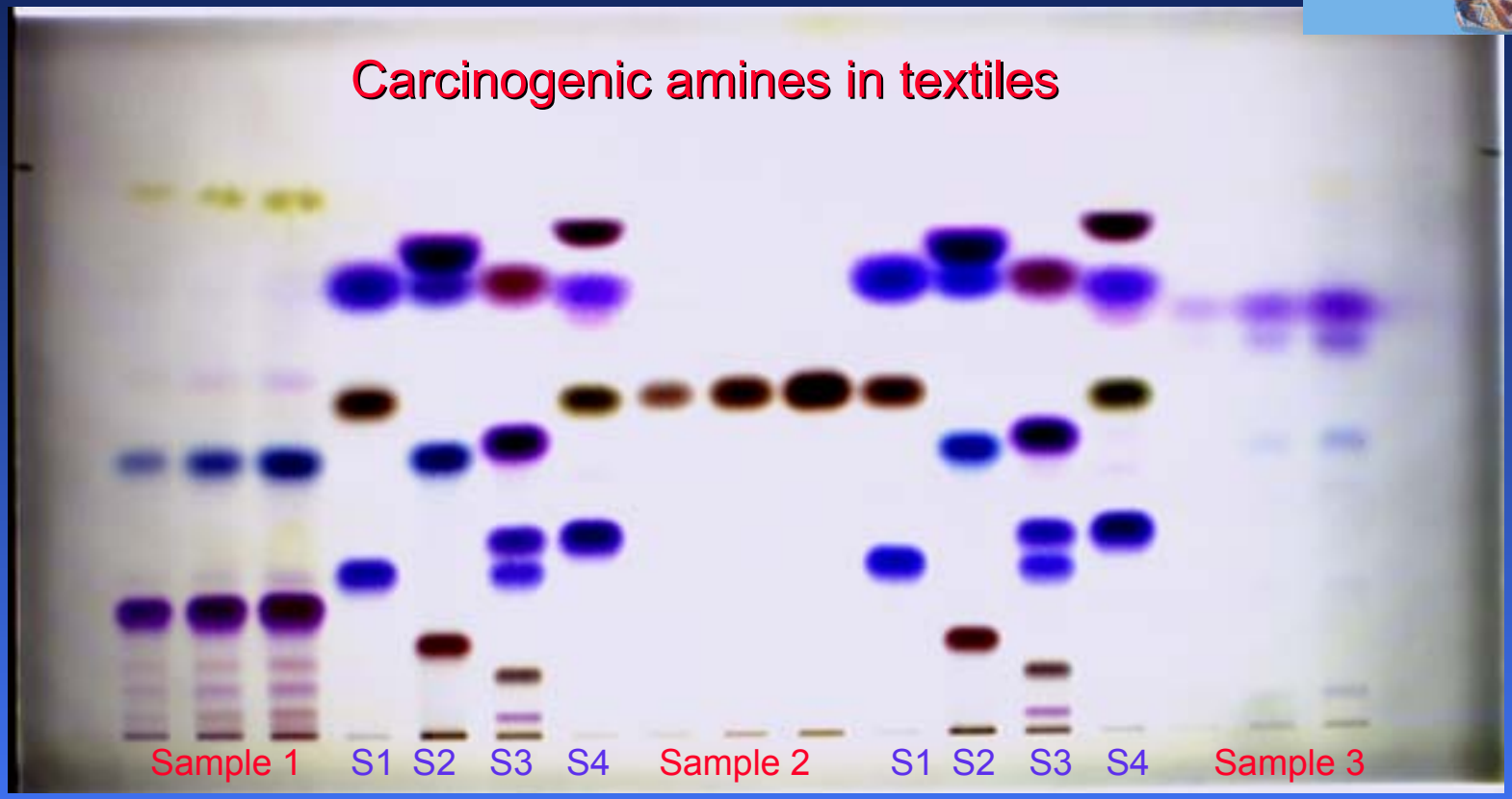
Effectiv analysis of carbohydrates



1 = D-Glucose, 3 = Maltose, 4 = Fructose, 5 = 1,6-Anhydroglycose & 1,4-3,6 Dianhydroglycose, 6 = Maltosan, 7 = Gentiobiose, 8 = Isomaltose, 9 = Maltulose

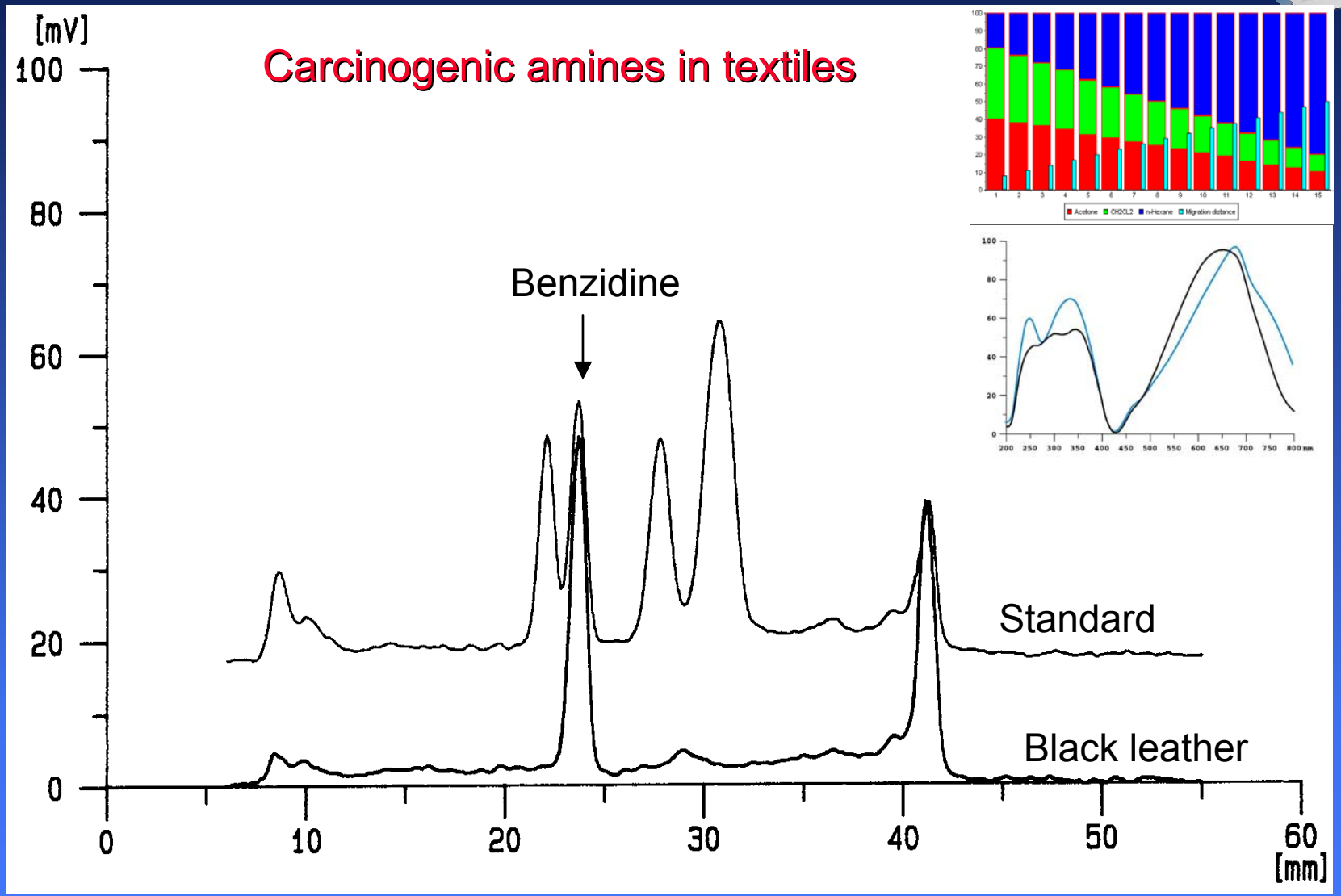
L. Kroh et al., Inst. for Food Chemistry, TU Berlin, see CBS 82

Effective screening

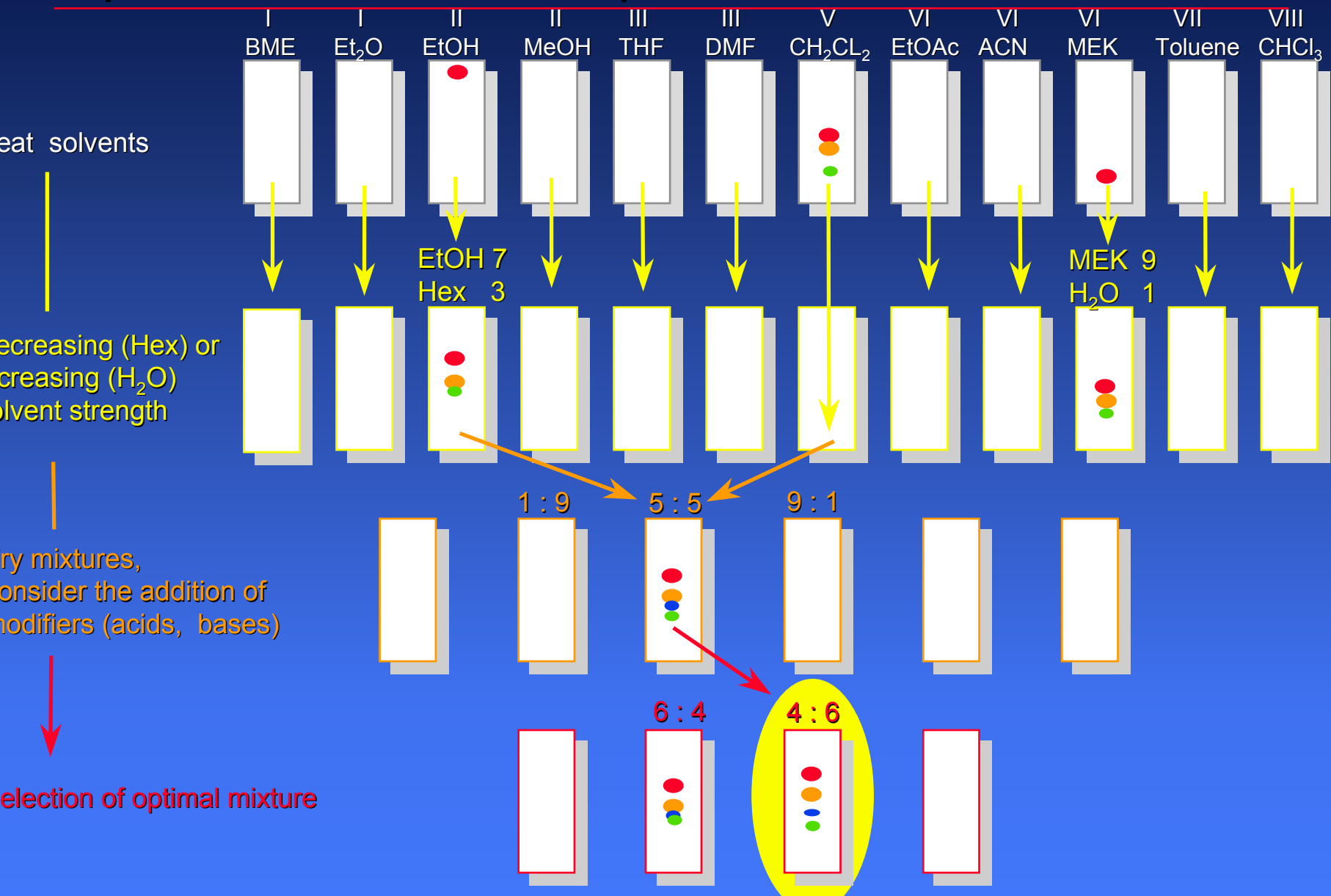


P. Kralicek, EMPA, St. Gallen, Switzerland,
optimized at CAMAG Laboratory, see CBS 75

...and cost effective confirmation



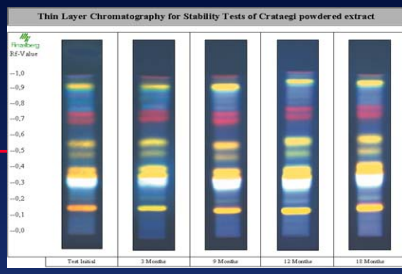
Optimization of mobile phase



Why HPTLC?

- ✓ All information at first glance
- ✓ High matrix tolerance
- ✓ Less effort for sample preparation
- ✓ Flexible detection and identification
- ✓ Rapid, sensitive and cost-effective
- ✓ Separation under identical conditions

Disadvantages – not at all!

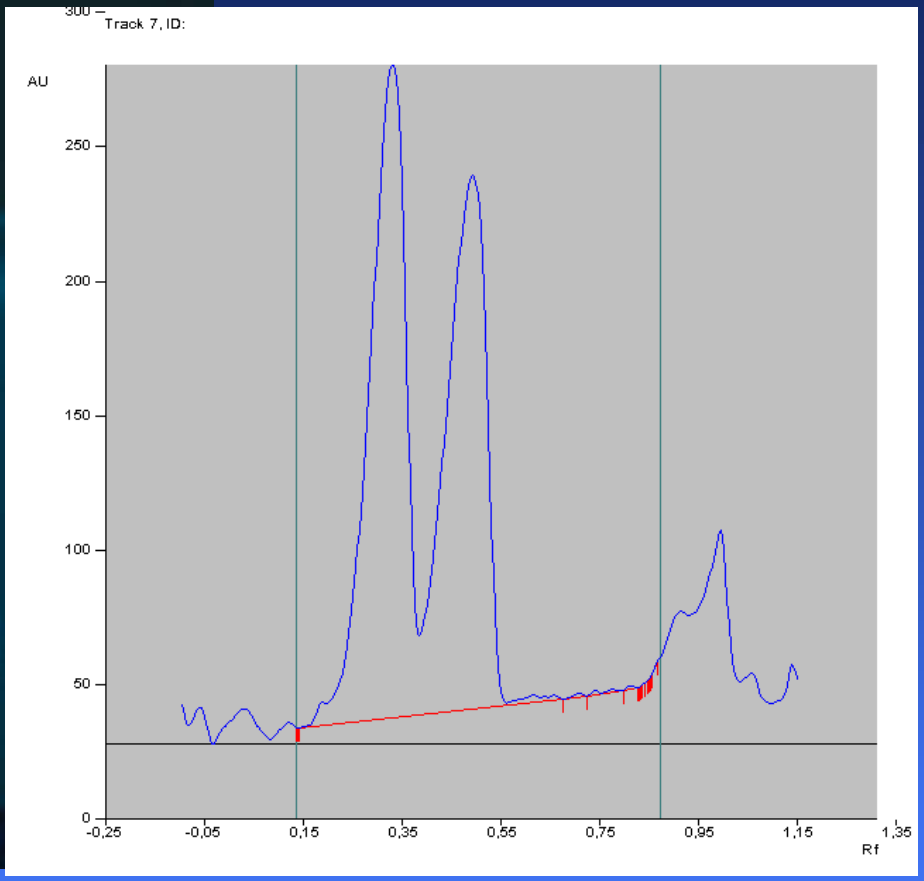


- ✓ (Room with air-conditioning system)
- ✓ (Reproducibility ⟷ thorough knowledge of factors of influence necessary!)
- ✓ (No black box, not fully automated, but info stored similar to a compact disk enables flexibility & creativeness!) ⟷
- ✓ (Open system... additional vapor phase, multi component mobile phase, activity of the sorbent - increases possibility for a good separation!)

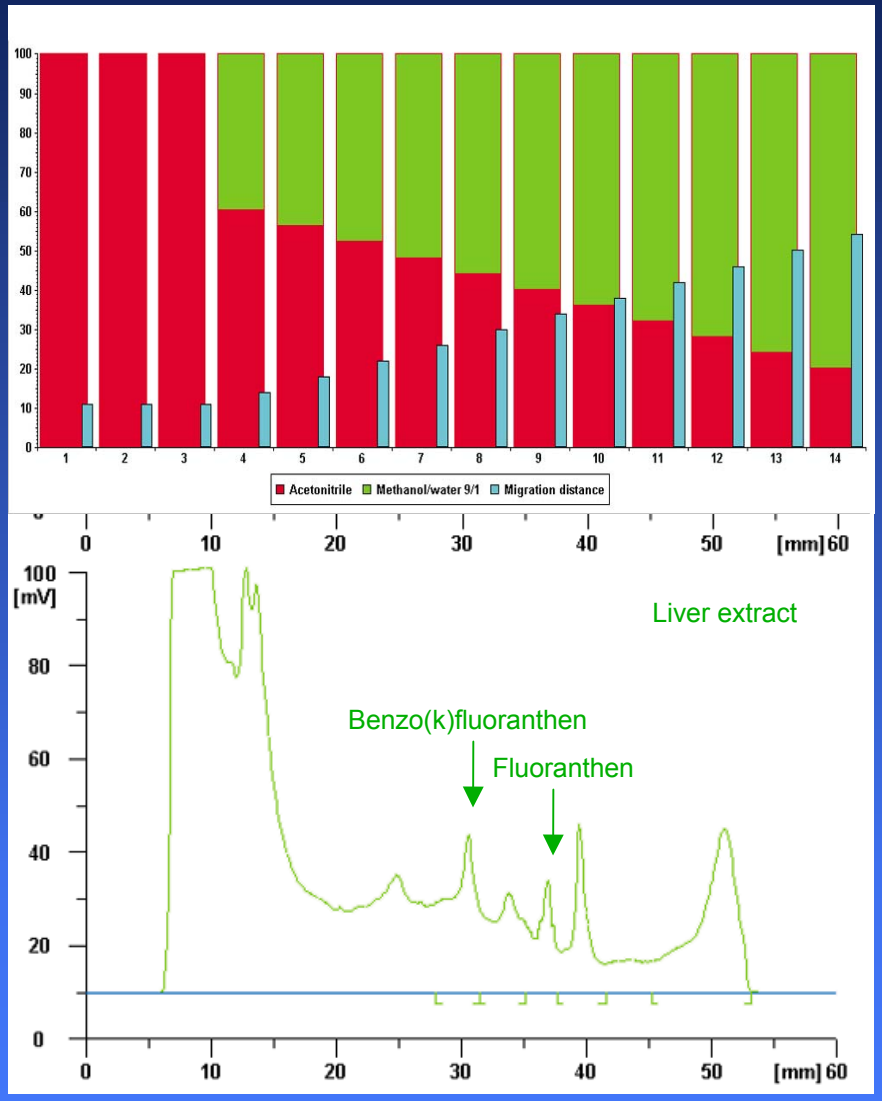
Rapid, sensitive and cost-effective

Optimized method of asparagine and glutamine

- Chromatography 25 s
- 280 µL solvent
- Lower ng-range

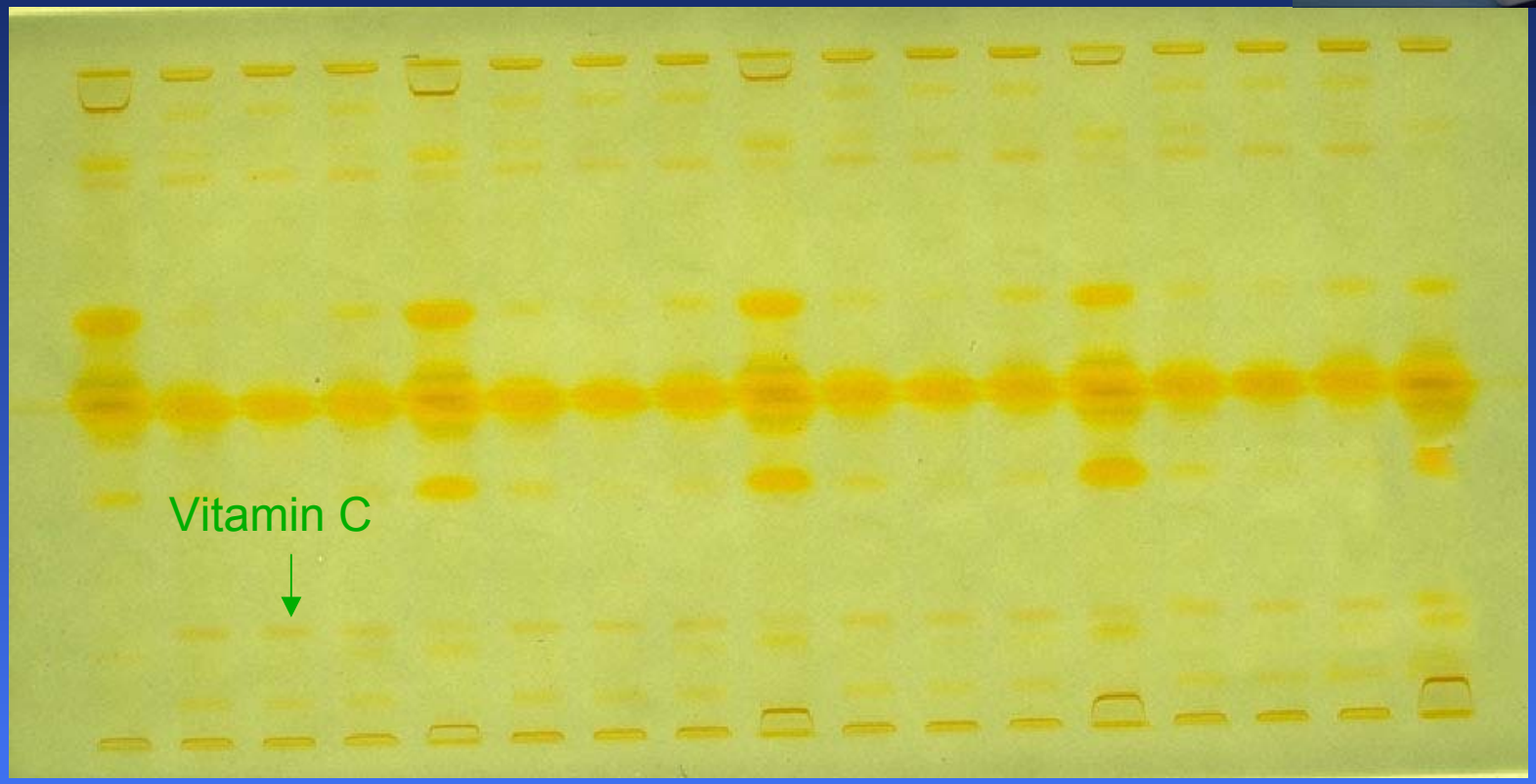


PAHs in lung and liver of animals

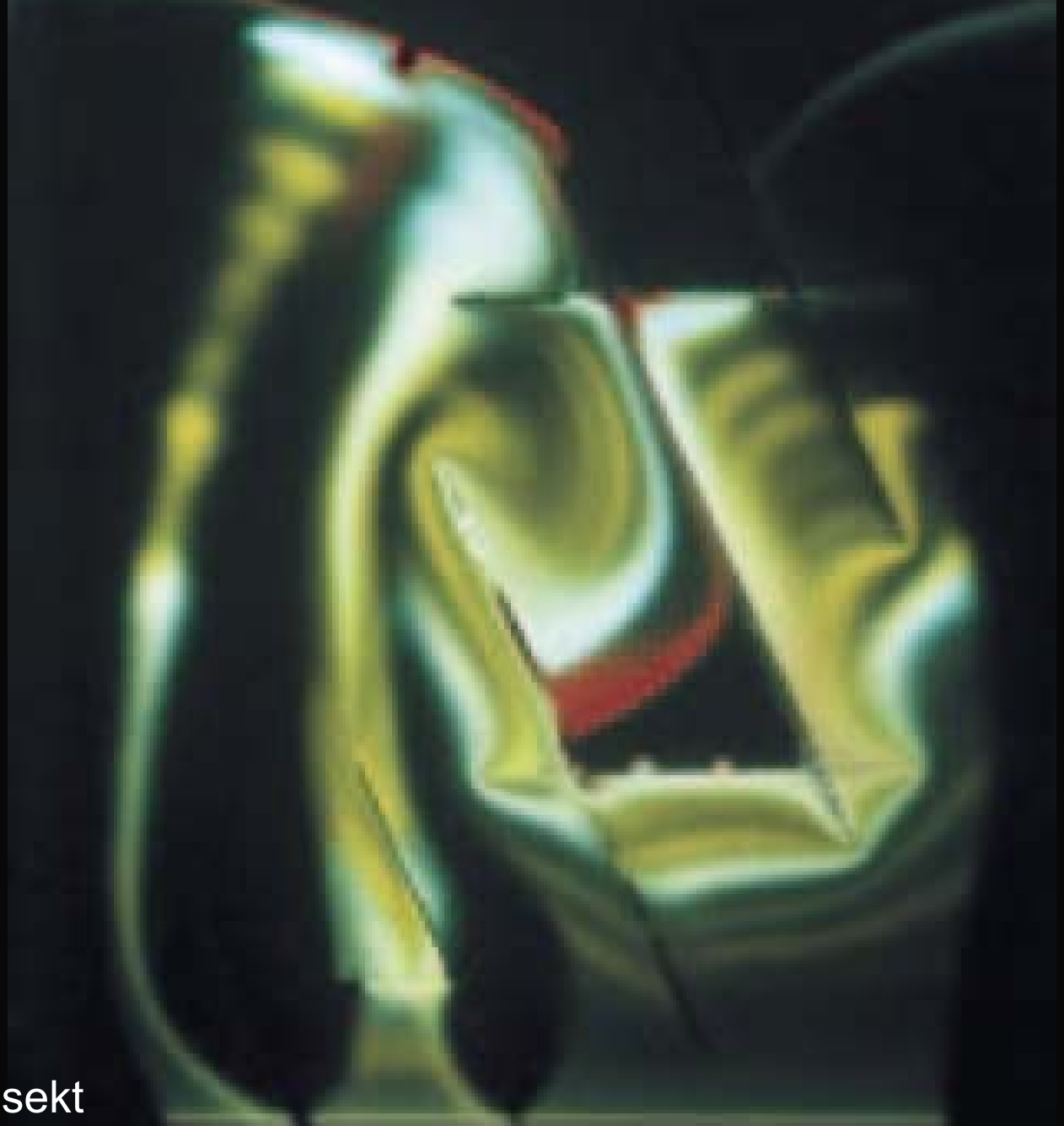


siehe CBS 83

Vitamin C in Fruchtsäften



siehe CBS 66



Das Insekt
E. Hahn-Deinstrop, CHROMart, GIT Special Separation 1/2000 S. 2-3

Christianes Beine

F. Hahn-Deinstrop, CHROMart, GIT Special Separation 1/2000 S. 2-3

Till Eulenspiegel von Mölln
F. Hahn-Deinstrop, CHROMart, GIT Special Separation 1/2000 S. 2-3

Sringbrunnen im Kurpark von Baden-Baden
E. Hahn-Deinstrop, CHROMart, GIT Special Separation 1/2000 S. 2-3

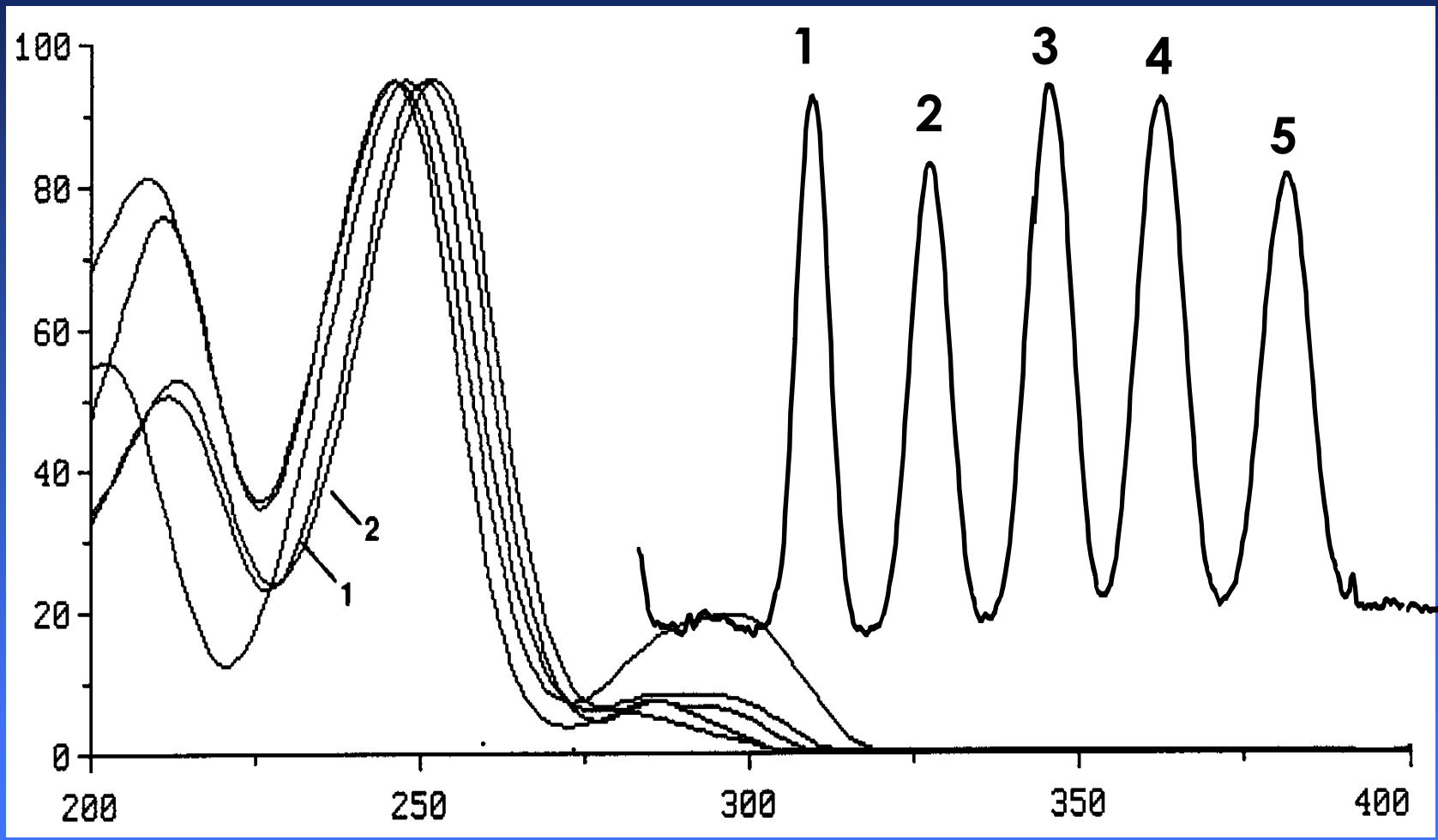
Wind
E. Hahn-Deinstrop, CHROMart, GIT Special Separation 1/2000 S. 2-3

Joseph, Maria und das Baby
F. Hahn-Deinstrop, CHROMart, GIT Special Separation 1/2000 S. 2-3

So bunt und kreativ kann Chromatographie sein!

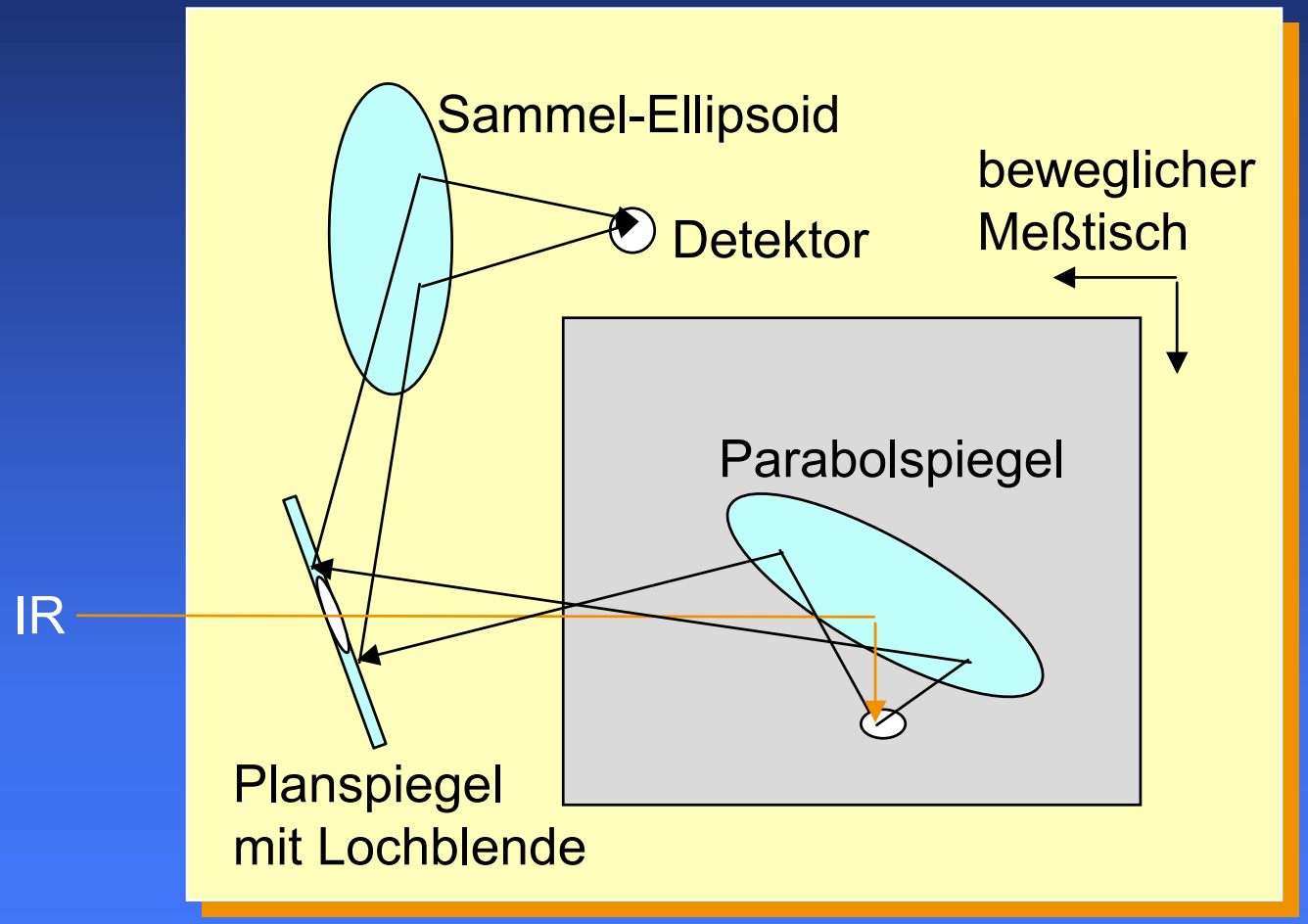
Gerda Morlock, Universität Hohenheim, Stuttgart

UV-spectra of 5 phenyl urea-herbicides

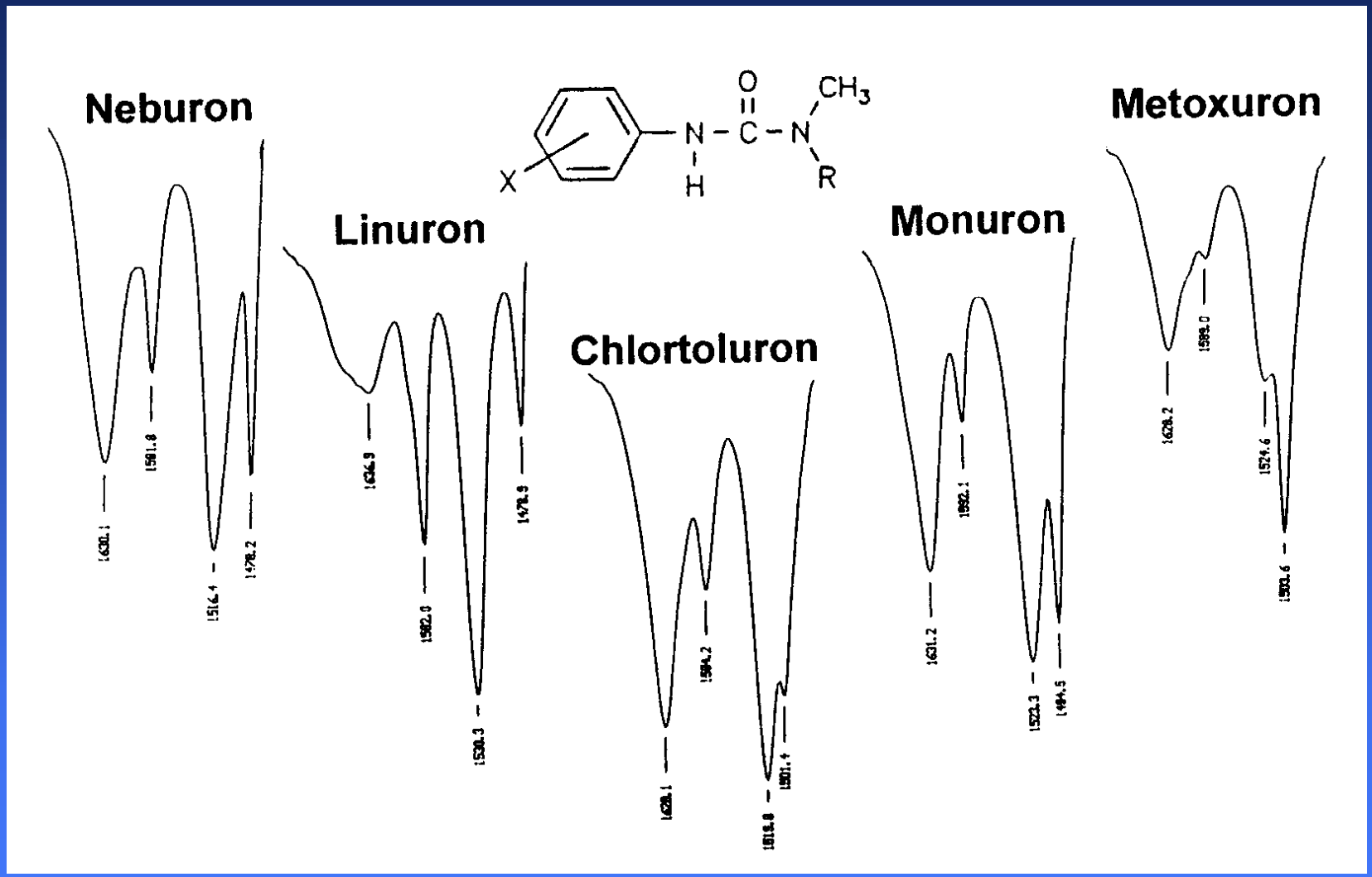


DRIFT-Technique

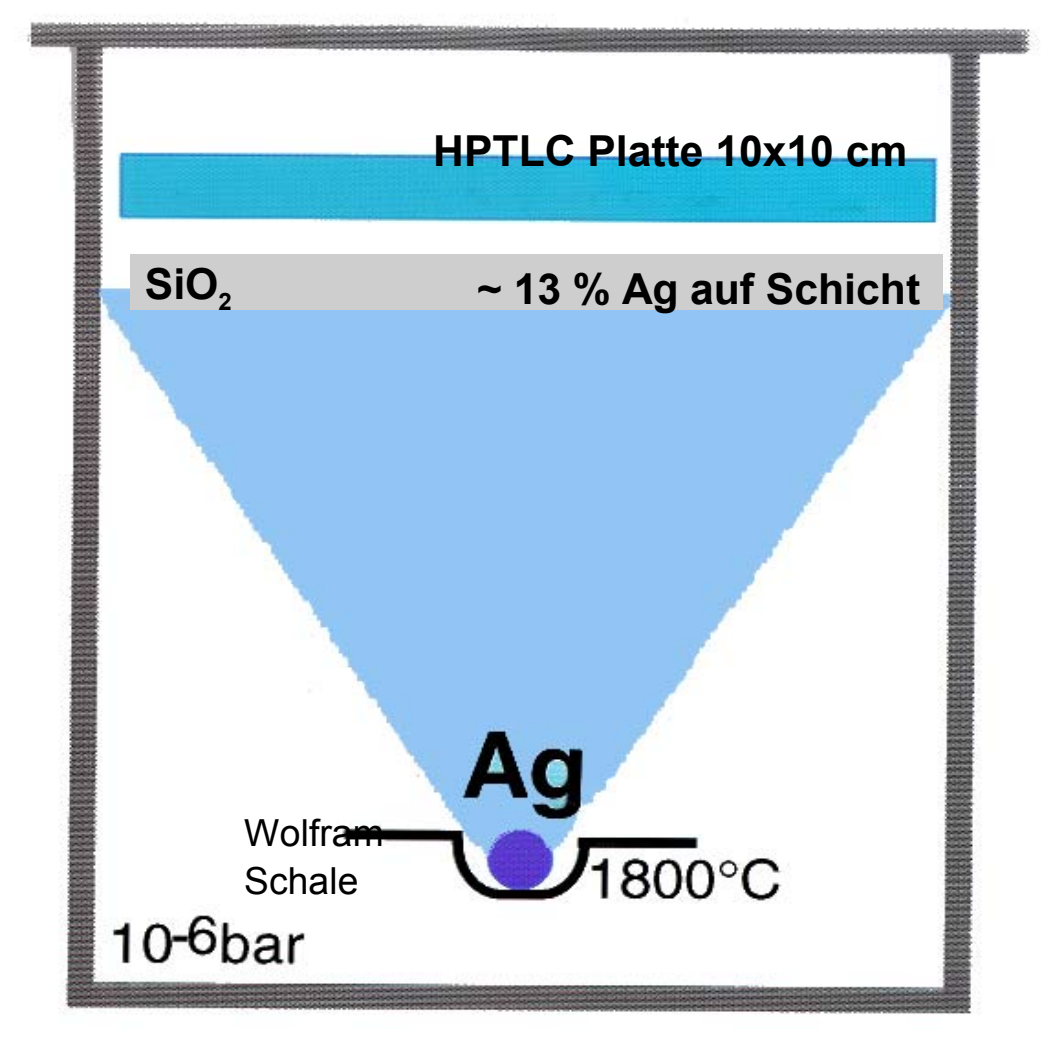
Diffuse Reflection Infrared Fourier Transform



Characteristical FTIR-bands

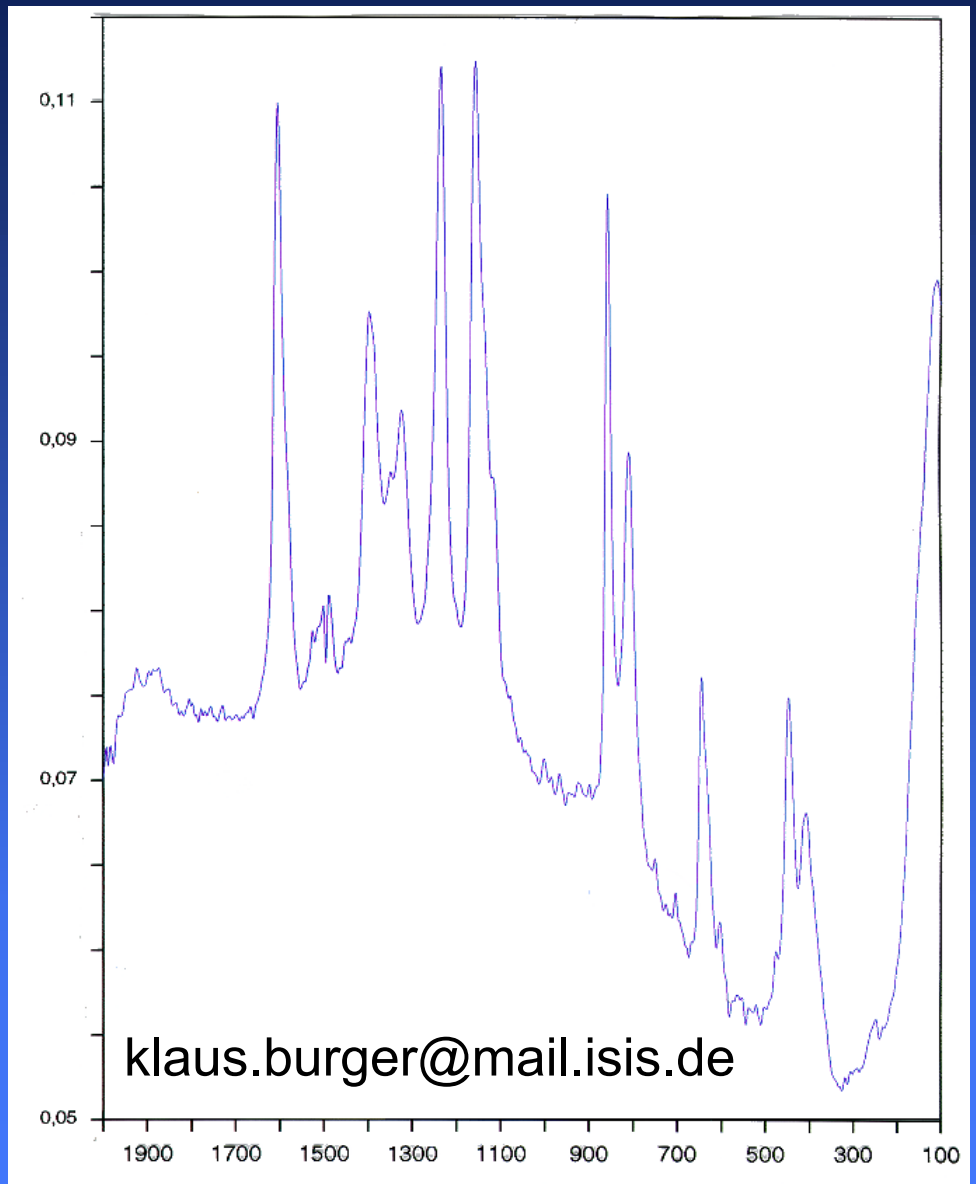


FT-RAMAN (SERS) - Vacuum Transfer

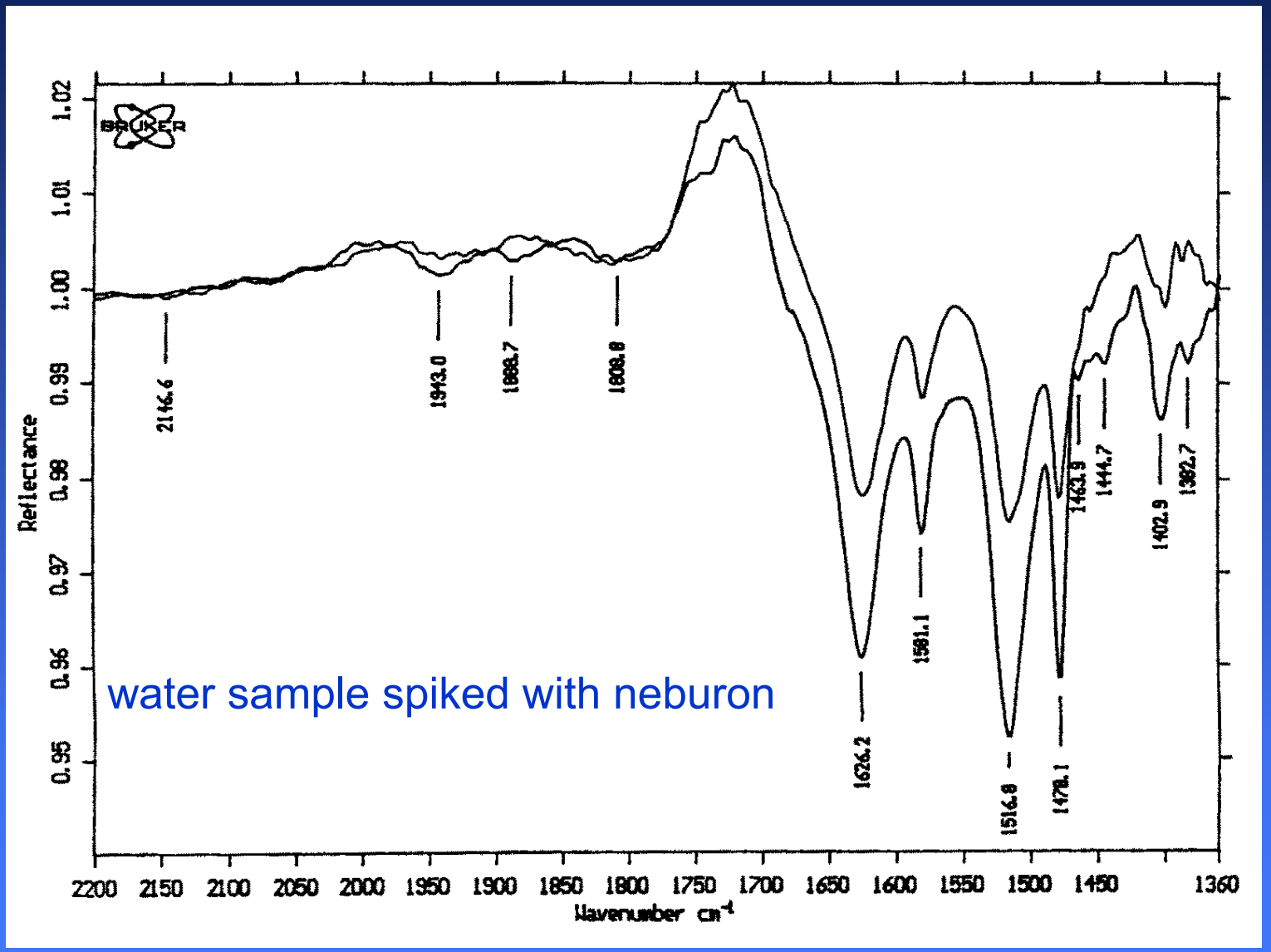


klaus.burger@mail.isis.de

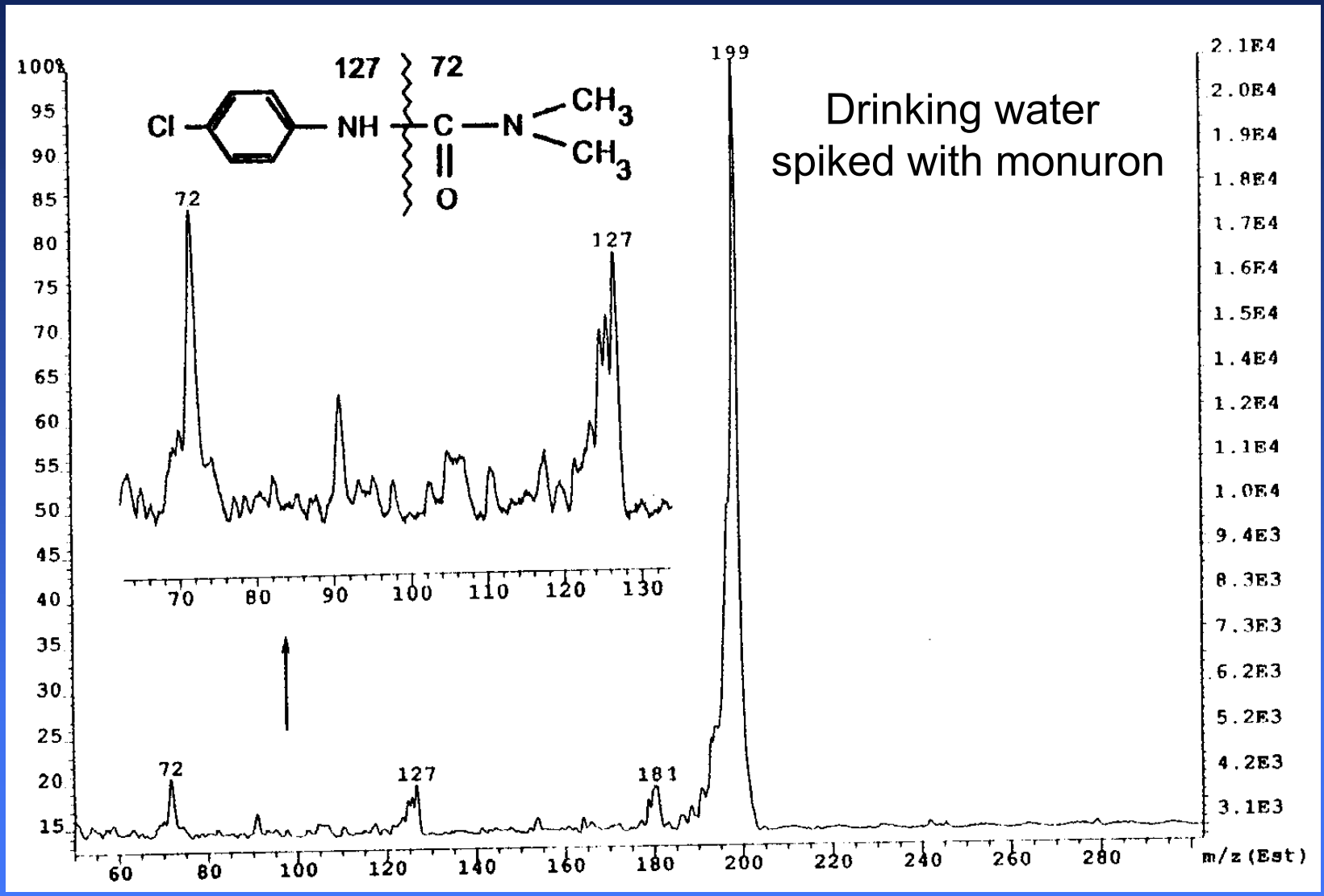
SERS-Spektrum von 10 ng Paranitrophenol



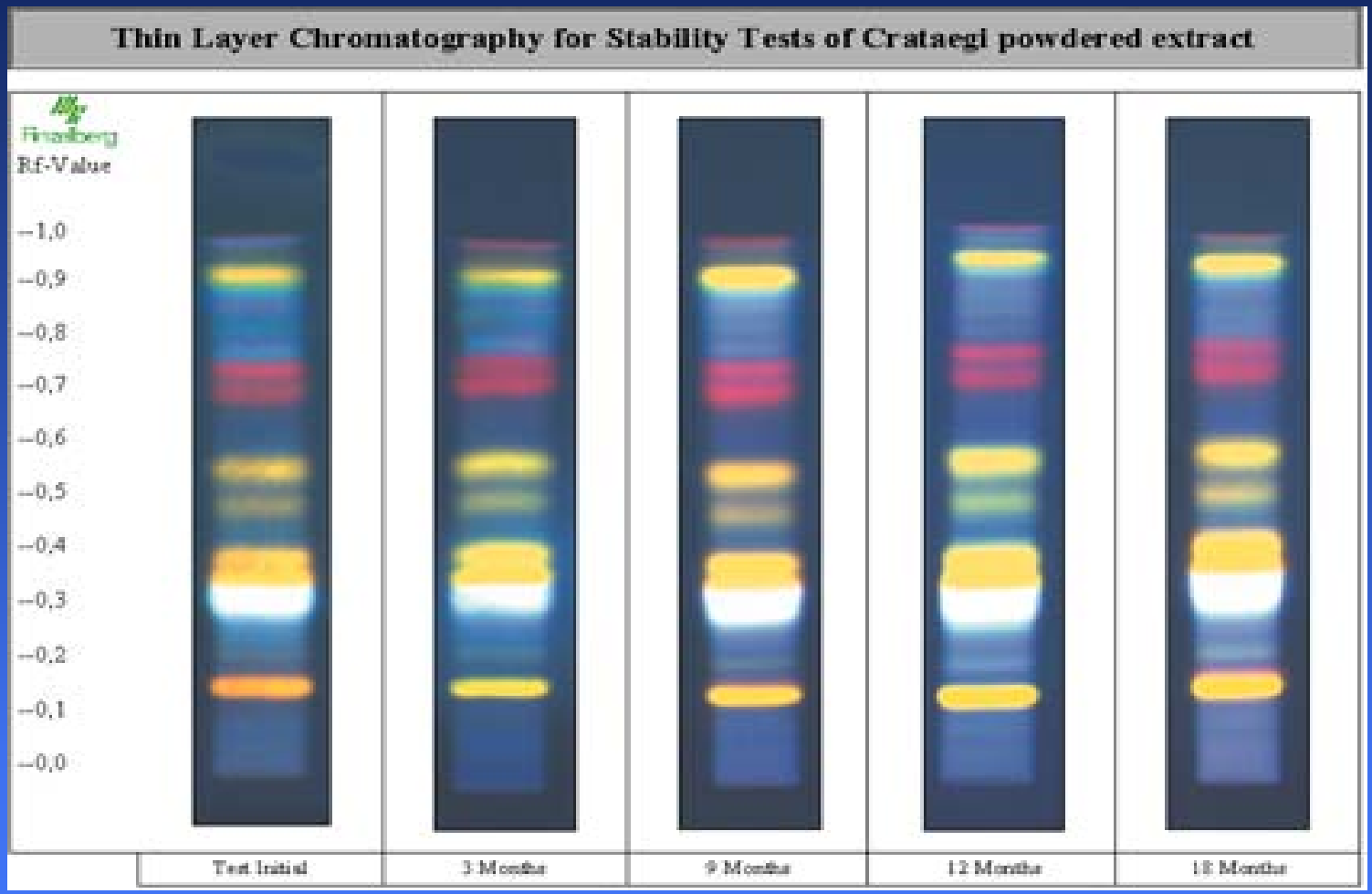
In situ-FTIR-spectrum



TLC-FAB-MS/MS


Drinking water
spiked with monuron
199
127
72
Cl
NH
C
N
CH3
CH3
O
72
127
181
m/z (Est)

Stability test



K. Thiekötter, Finzelberg GmbH & Co. KG, see CBS 85