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‚Printing' for derivatisation in HPTLC

Wolfgang Schwack
Institute of Food Chemistry
University of Hohenheim

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Printing on TLC?

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Printing
on chocolate and tart cover

www.kopyform.de

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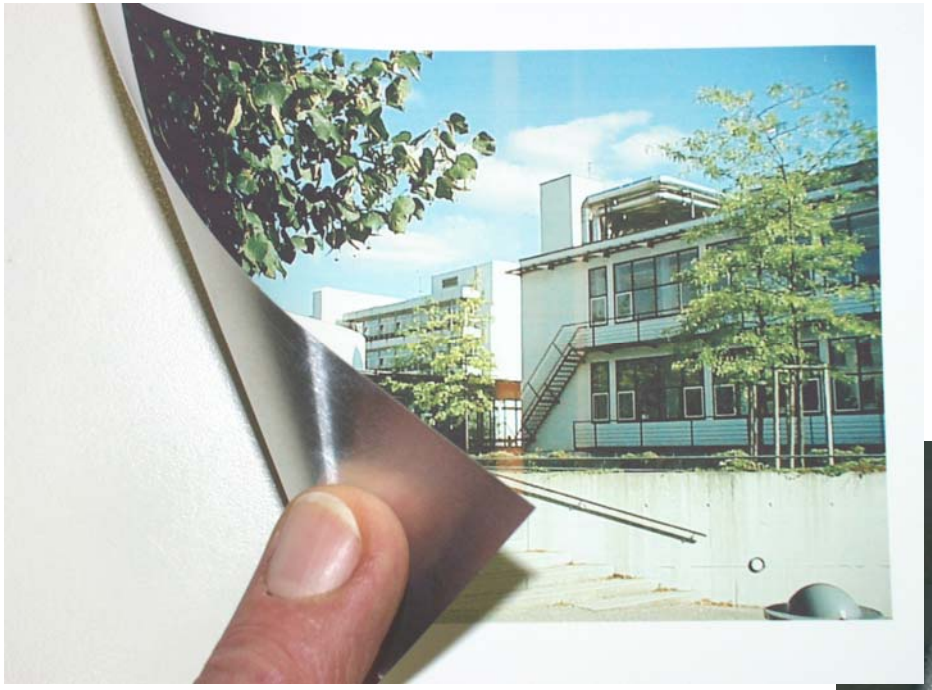
Printing on TLC



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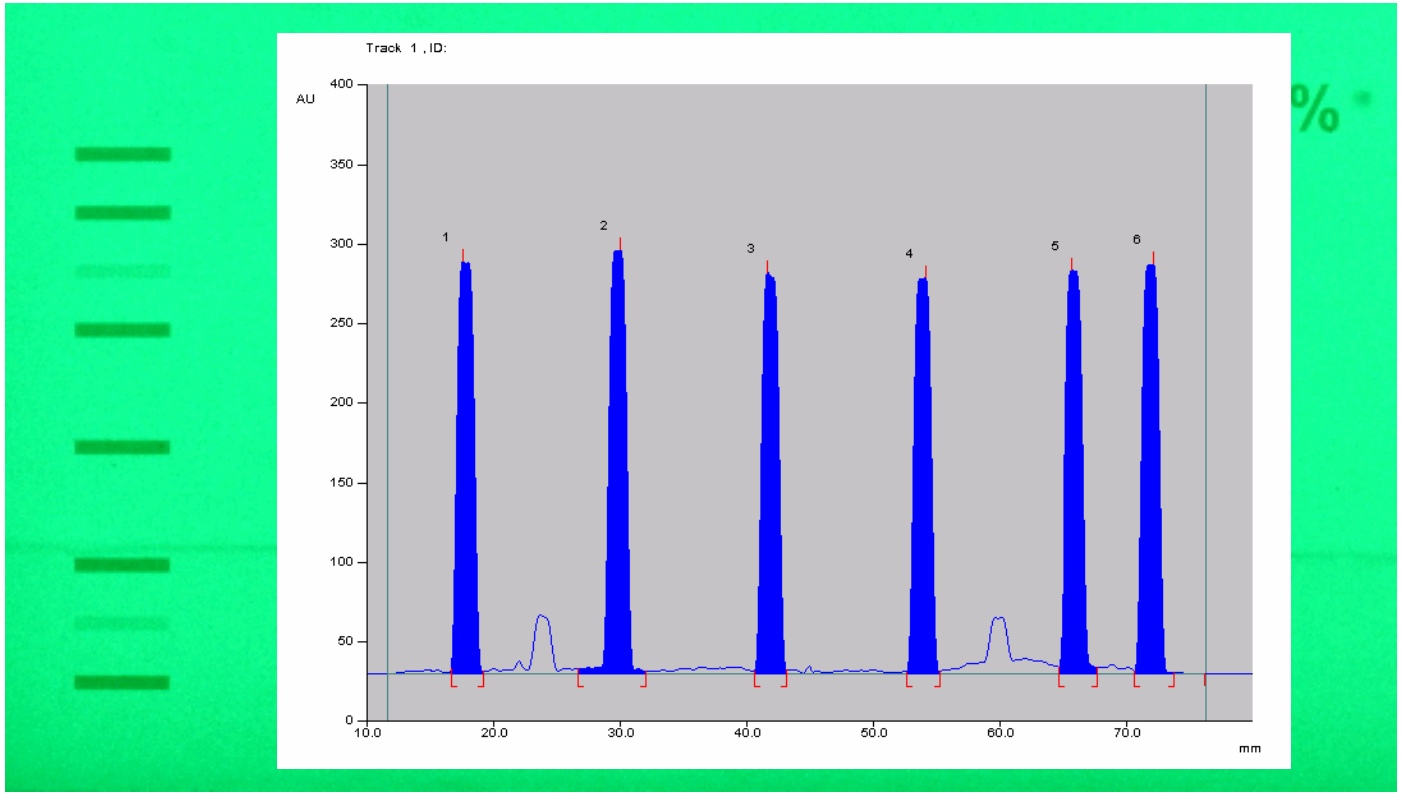
Printing on TLC



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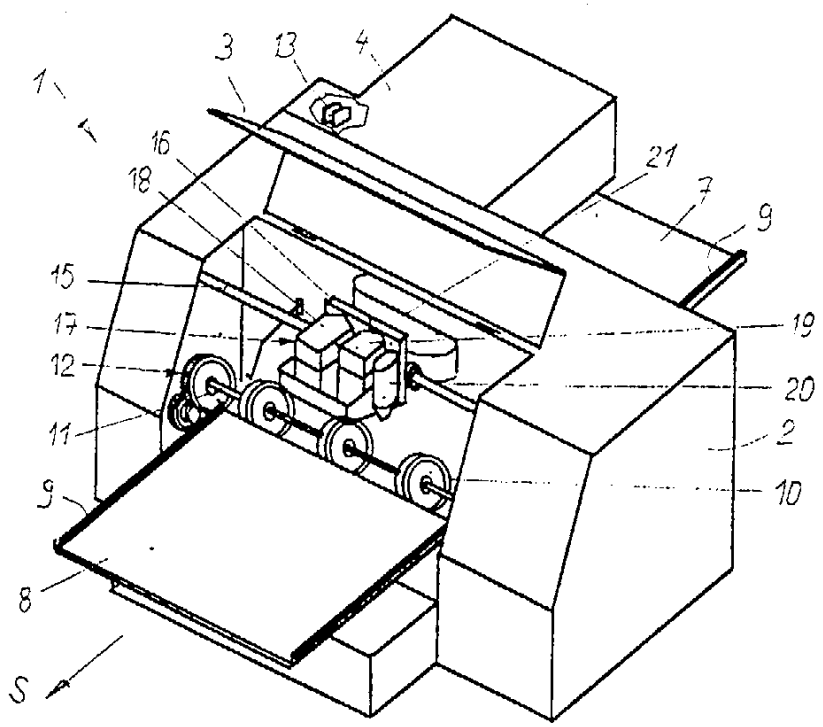
Patent CH 692 008 A5

(S. Nyiredy, 2001)



‚Device for fully automatic TLC‘

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Our workstation

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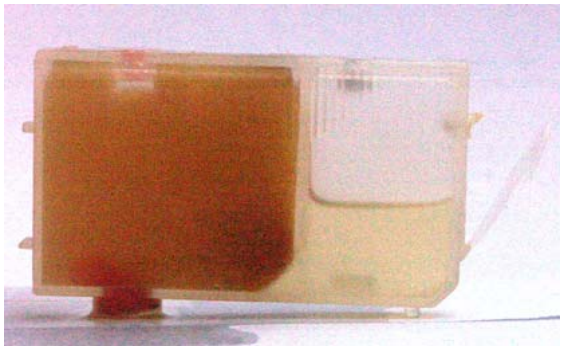
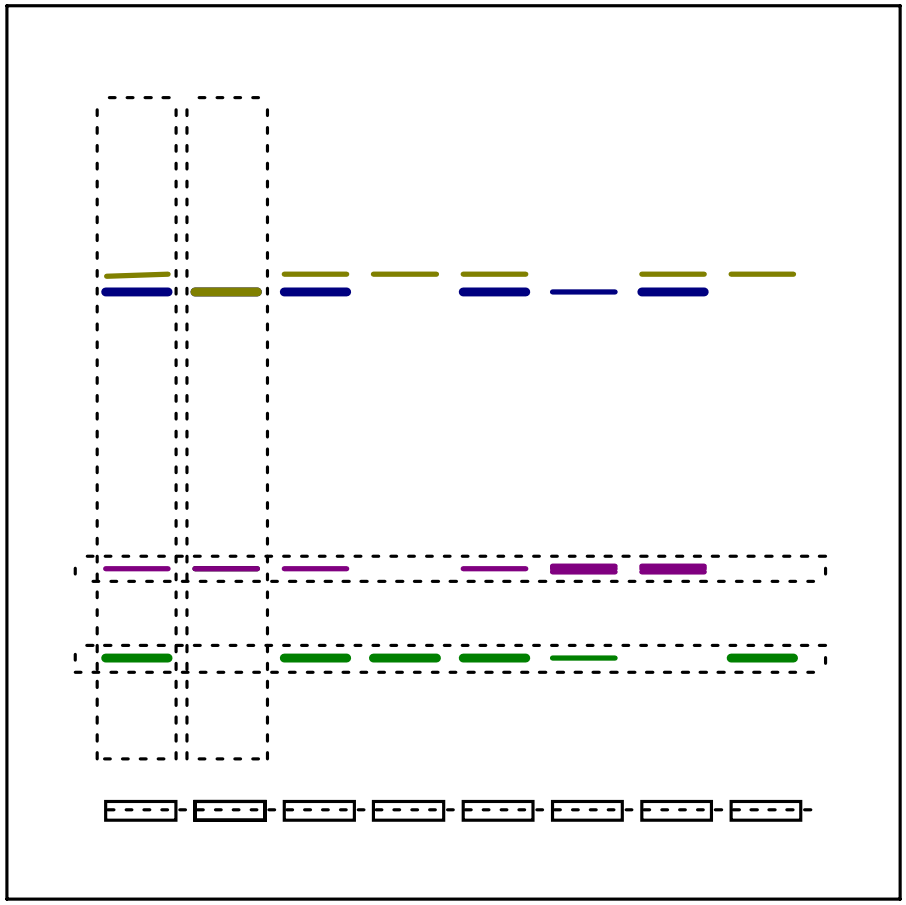
Printing tracks and zones





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Printer driver/menu

- adressing the right cartridge(s)?
- achieving maximum reagent output?
- software for constructing the printing pattern?

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Printer menu

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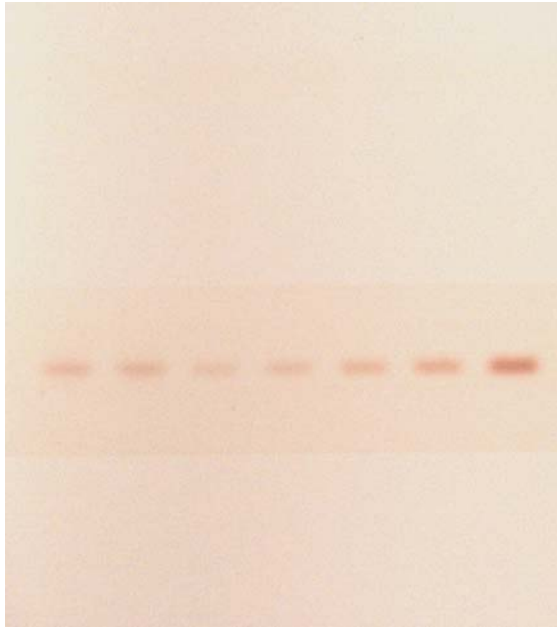
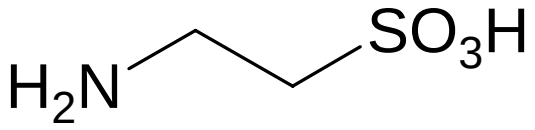
Taurine in energy drinks [1)]

post-chromatographic derivatisation



Red Bull samples | calibration (160-800 ng)



printed zone
(1,6 % ninhydrin, 4x)

1) Aranda, M., Morlock, G. (2006), J. Chromatogr. A, in press

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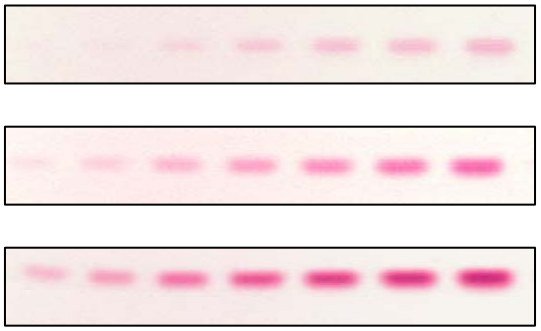
Taurine in energy drinks

printer

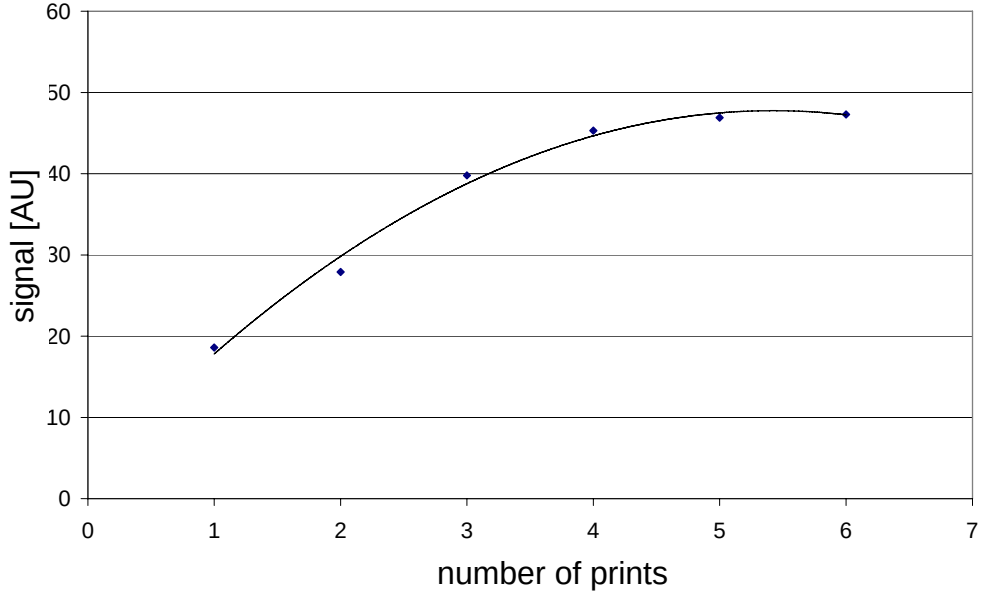


1x

3x

5x

dipping chamber [1)]



1) Aranda, M., Morlock, G. (2006), J. Chromatogr. A, in press

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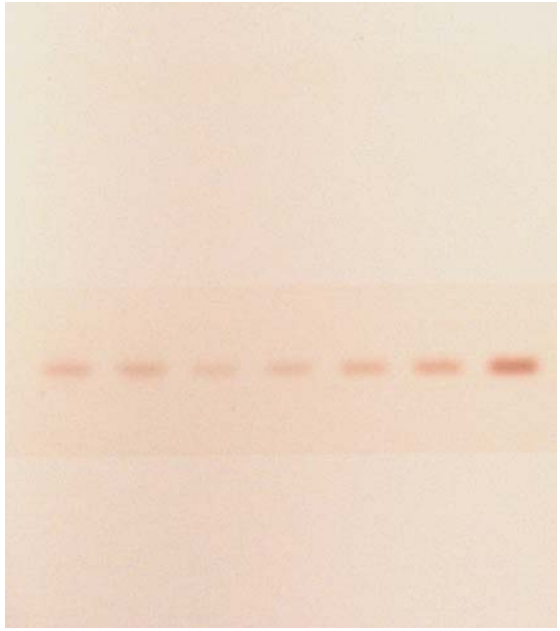
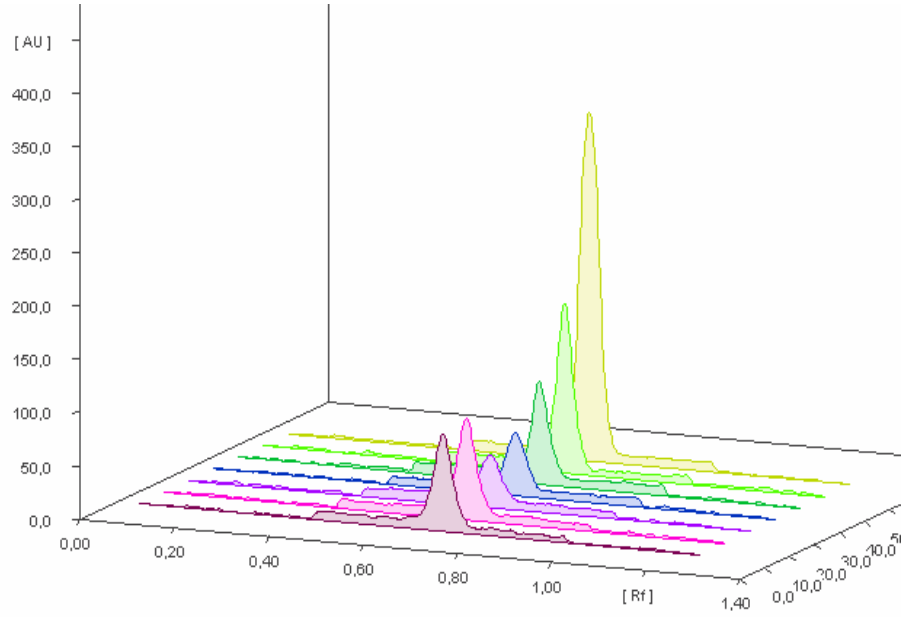
Taurine in energy drinks [1)]



Red Bull samples



calibration (160-800 ng)

1) Aranda, M., Morlock, G. (2006), J. Chromatogr. A, in press

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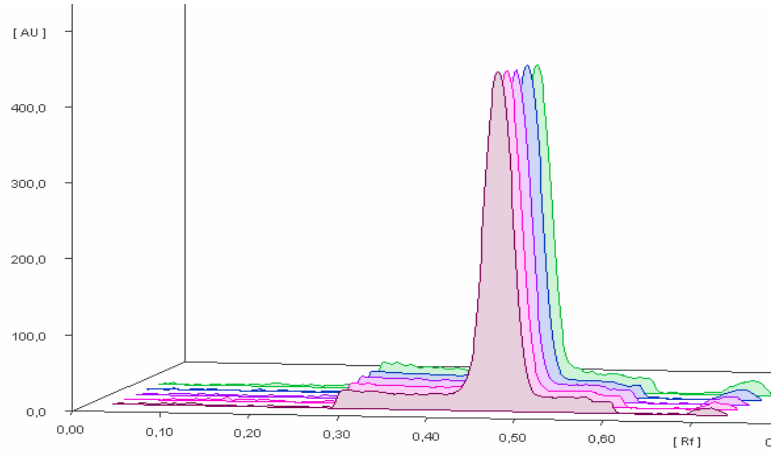
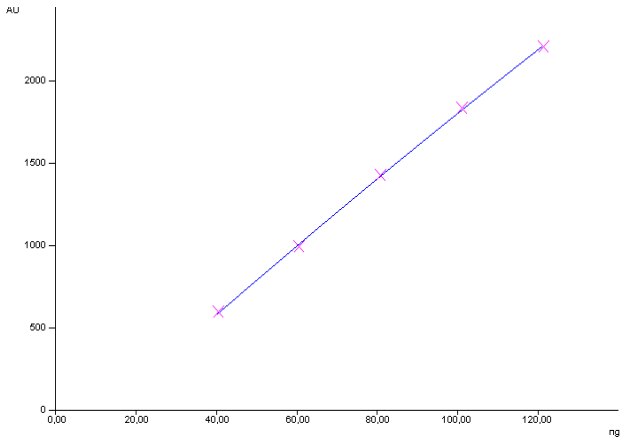
Taurine in energy drinks





	dipping [1)]	**printing** [*)]
LOD	41 ng	34 ng
LOQ	82 ng	85 ng
Correlation (RSD)	0.9 %	1.0 %
Repeatability (RSD)	0.9 %	1.0 %

*) 4fold print

1) Aranda, M., Morlock, G. (2006), J. Chromatogr. A, in press

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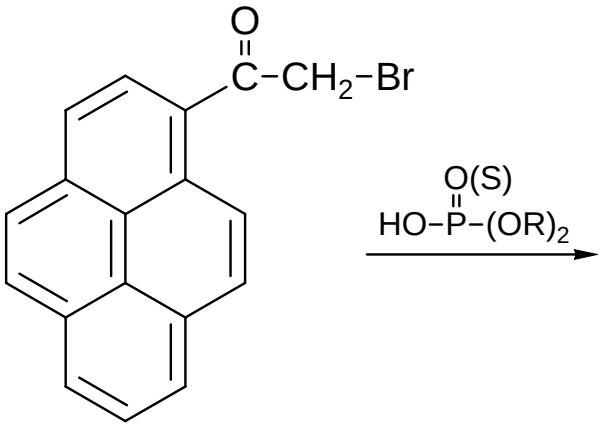
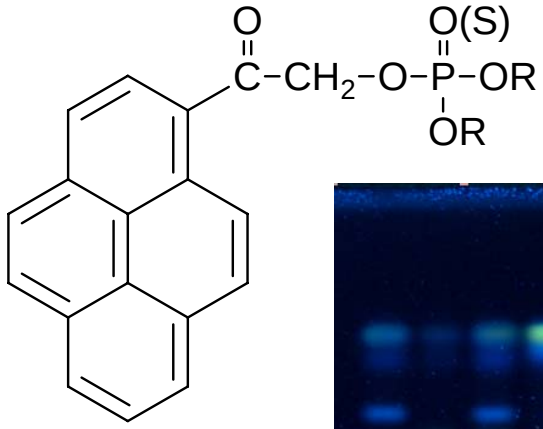
Organophosphorus acids in fruit juices [1)]

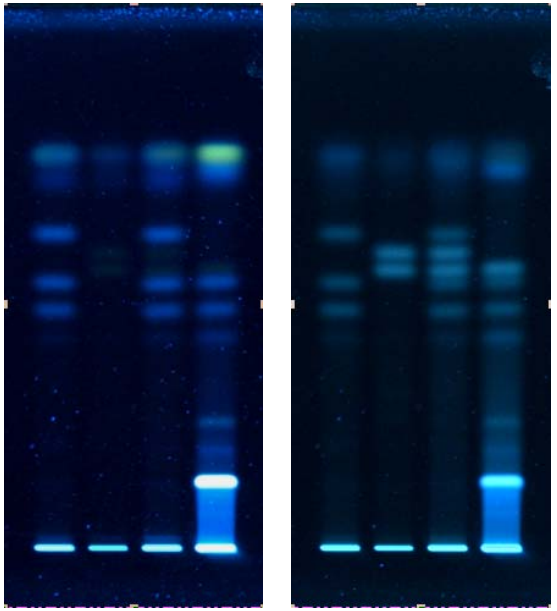
pre-chromatographic derivatisation (in vial)
(bromoacetylpyrene)



BAP



- $(CH_3O)_2$-P(O)-OH
- $(C_2H_5O)_2$-P(O)-OH
- $(CH_3O)_2$-P(S)-OH
- $(C_2H_5O)_2$-P(S)-OH



1) Morlock, G.; Schwack, W., unpublished results

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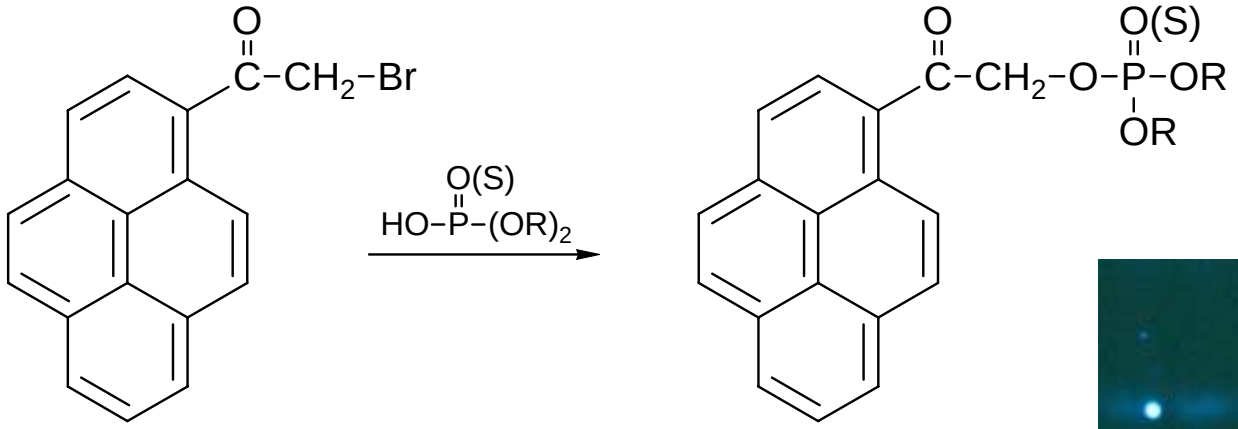
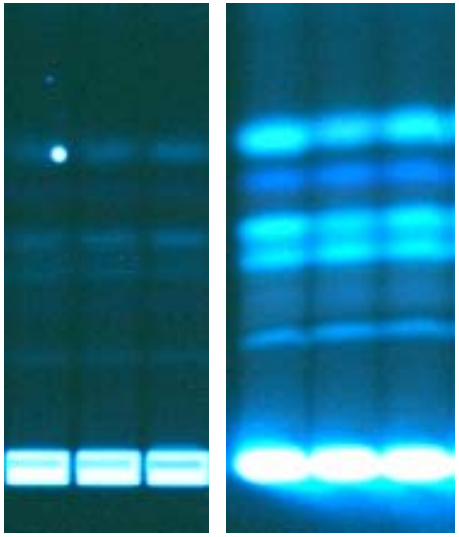
Organophosphorus acids in fruit juices

pre-chromatographic derivatisation (‚in situ‘)
(bromoacetylpyrene)



BAP

☺



ATS4

printer ↔ ATS4 ??

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Organophosphorus acids

diethyl phosphate		
	ATS4 a)	**printer** b)
LOD	58 ng	773 ng
LOQ	174 ng	1770 ng
Correlation (RSD)	2.4 %	1.0 %
Repeatability (RSD)	2.5 %	3.8 %

a) 1 µL overspotting; b) 4fold print

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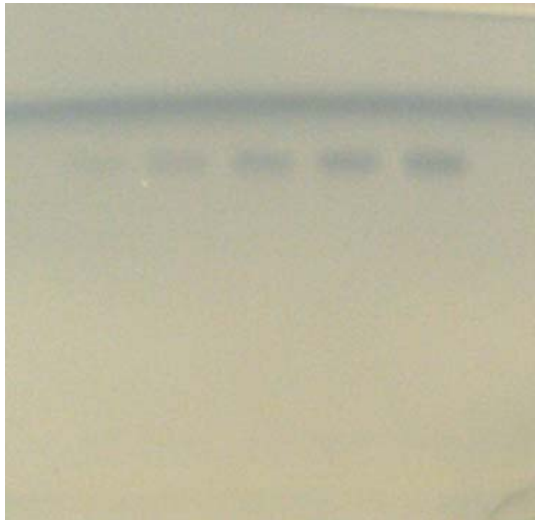
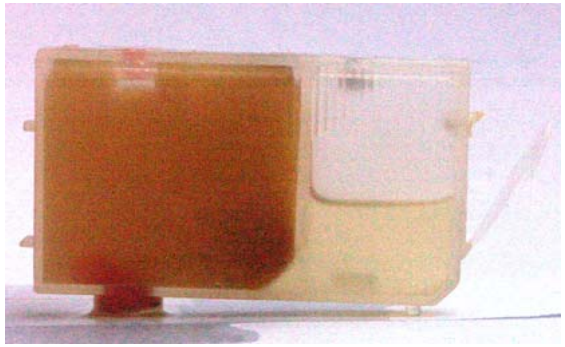
Ergosterol
(marker for fungus contamination)

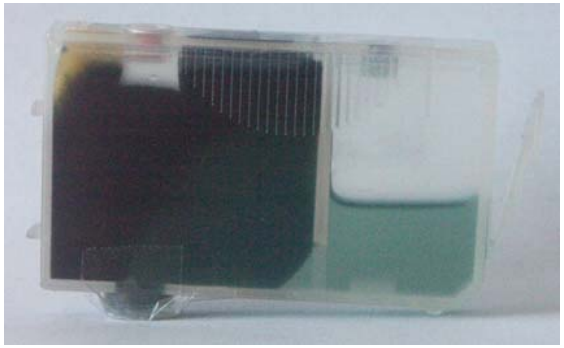
post-chromatographic derivatisation (molybdatophosphoric acid)



17 – 80 ng sterol



after 30 min



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Résumé

It principally works!

Advantages

- selective derivatisation of distinct areas on a TLC plate
- low consumption of reagents (~ 10 µL/cm^2)
- homogenous reagent application without formation of aerosols (clean workplace)
- …

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Spraying cabinet

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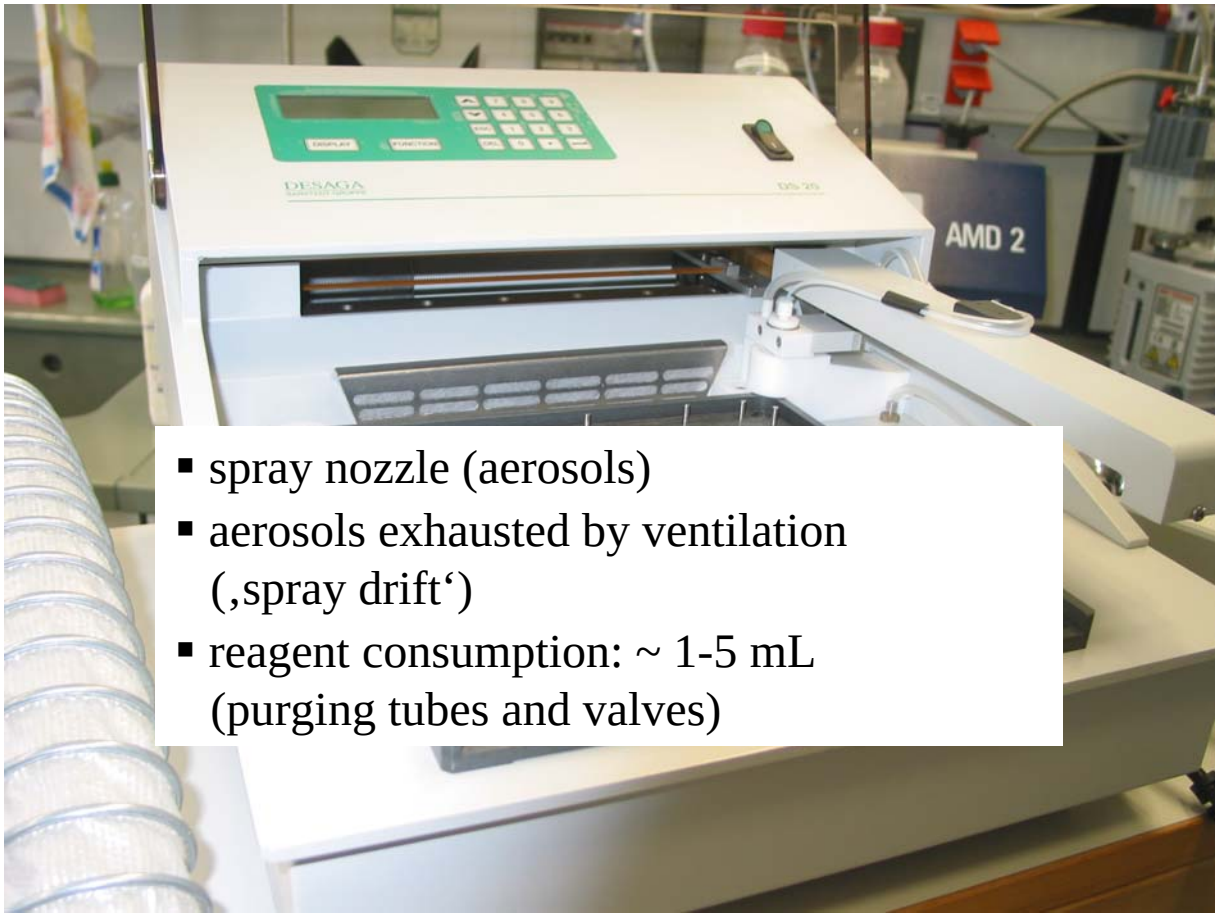
Chromajet DS20
(Desaga)



- spray nozzle (aerosols)
- aerosols exhausted by ventilation (‚spray drift‘)
- reagent consumption: ~ 1-5 mL (purging tubes and valves)

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Résumé

It principally works!

Advantages

- selective derivatisation of distinct areas on a TLC plate
- low consumption of reagents (~ 10 µL/cm^2)
- homogenous reagent application without formation of aerosols (clean workplace)
- rather cheap and lightweight device (‚field lab‘)

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Résumé

It principally works!

Advantages

- selective derivatisation of distinct areas on a TLC plate
- low consumption of reagents (~ 10 µL/cm^2)
- homogenous reagent application without formation of aerosols (clean workplace)
- rather cheap and lightweight device (‚field lab')

Duties

- development of a special printer driver (‚reagent amont')
- development of printer suitable reagent formulations
- chip controlled ink cartridges

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Many thanks!

- Constanze Stiefel (‚Master thesis‘ in food chemistry)
- Dr. Gerda Morlock
- CAMAG and Merck
- …

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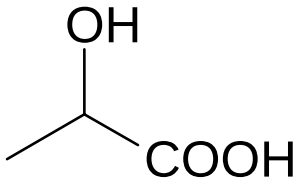
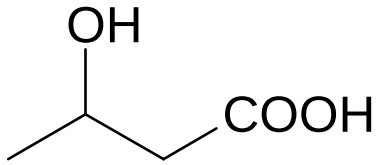
Organic acids in eggs and egg products [1)]





	lactic acid		β-hydroxybutyric acid	
	ATS4 [a)]	**printer** [b)]	**ATS4** [a)]	**printer** [b)]
LOD	1.6 ng	9.2 ng	0.4 ng	2.6 ng
LOQ	5.2 ng	27.5 ng	1.3 ng	7.8 ng
Correlation (RSD)	2.4 %	1.0 %	1.2 %	1.2 %
Repeatability (RSD)	2.5 %	3.8 %	1.3 %	2.0 %

a) 1 µL overspotting; b) 4fold print

1) Stiefel, C., Morlock, G.; Schwack, W., unpublished results

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Ink cartridges