

# New Horizons in Instrumental TLC

**Rolf Rolli**  
**CEO CAMAG**



## Agenda

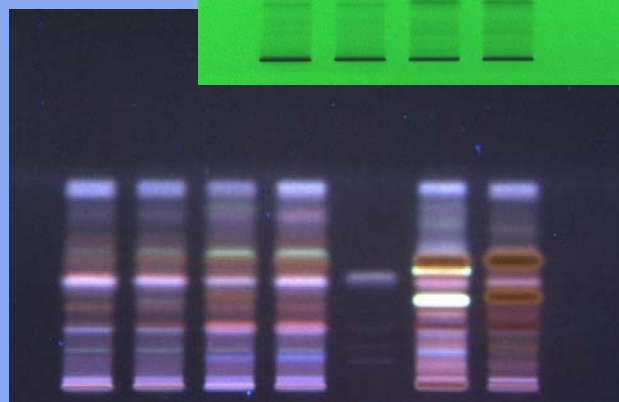
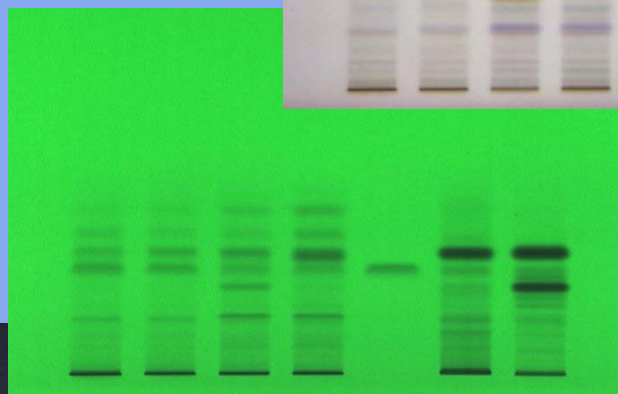
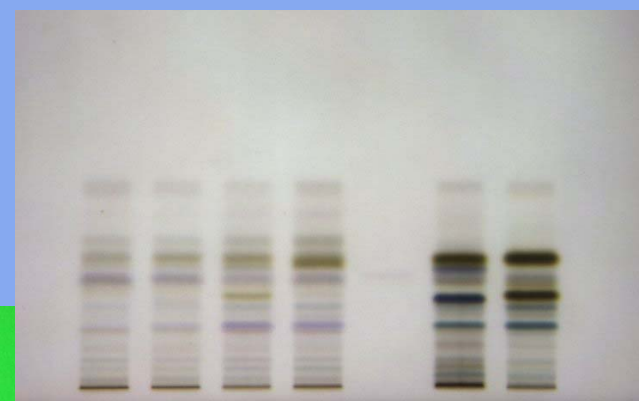
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- TLC VISUALIZER – a new powerful evaluation, visualization and archiving system for TLC plates
- TLC-MS Interface
- New applications fields for Instrumental TLC/HPTLC

# TLC Visualizer

**CAMMAG**

A new powerful evaluation,  
visualization and archiving system  
for TLC plates

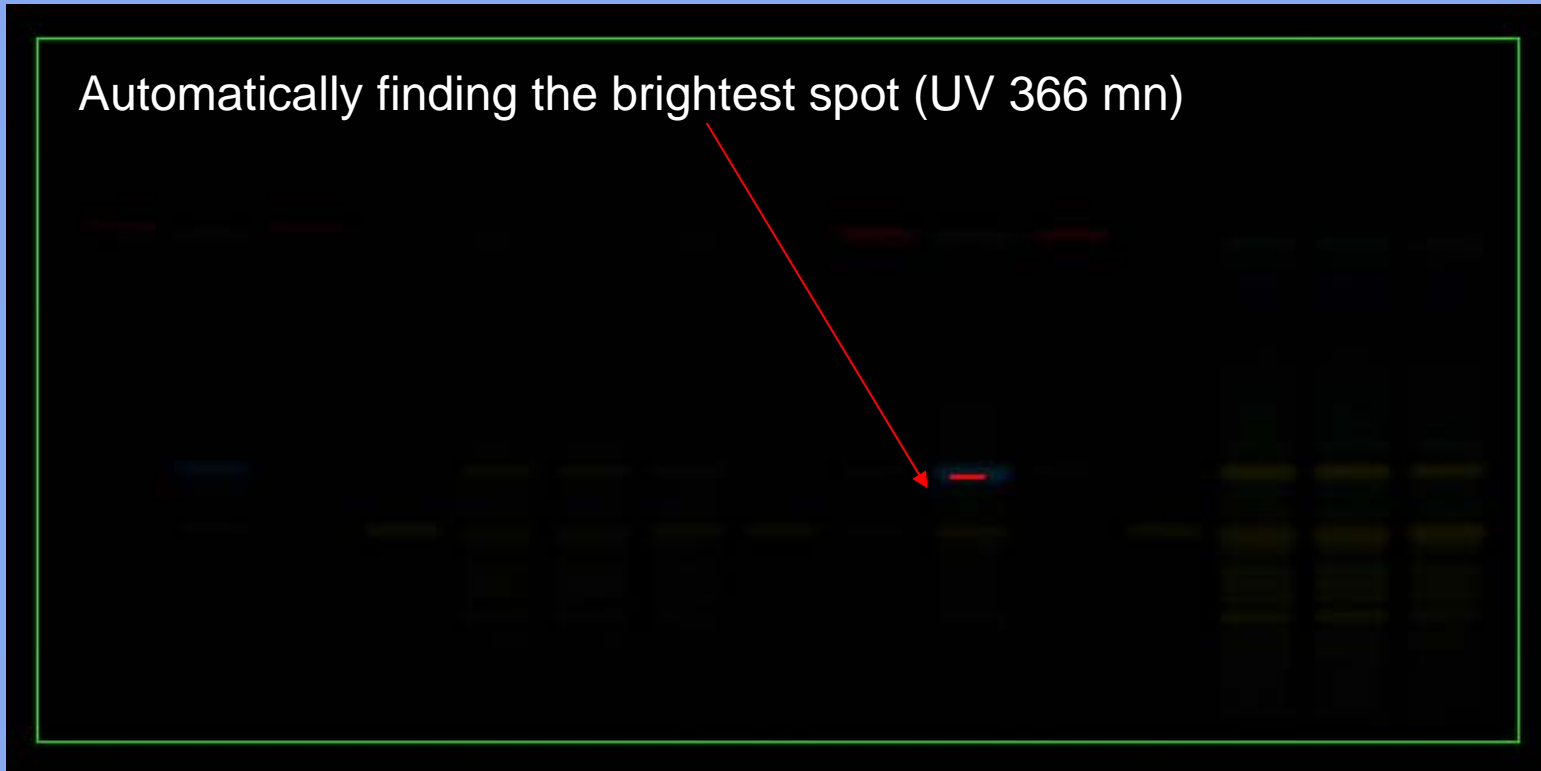


# Automatic Optimization

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**CAMMAG**

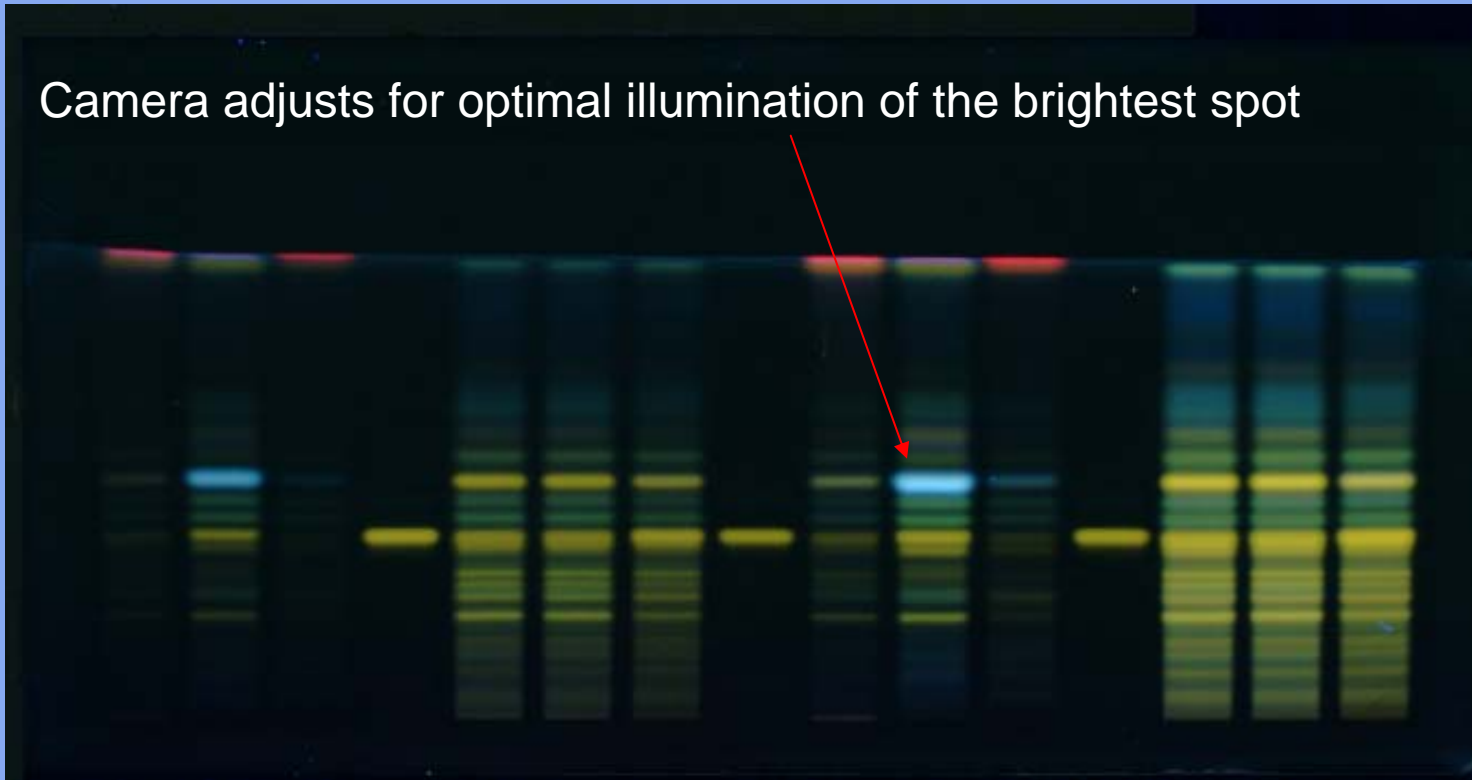
Automatically finding the brightest spot (UV 366 nm)



# Automatic Optimization

**CAMMAG**

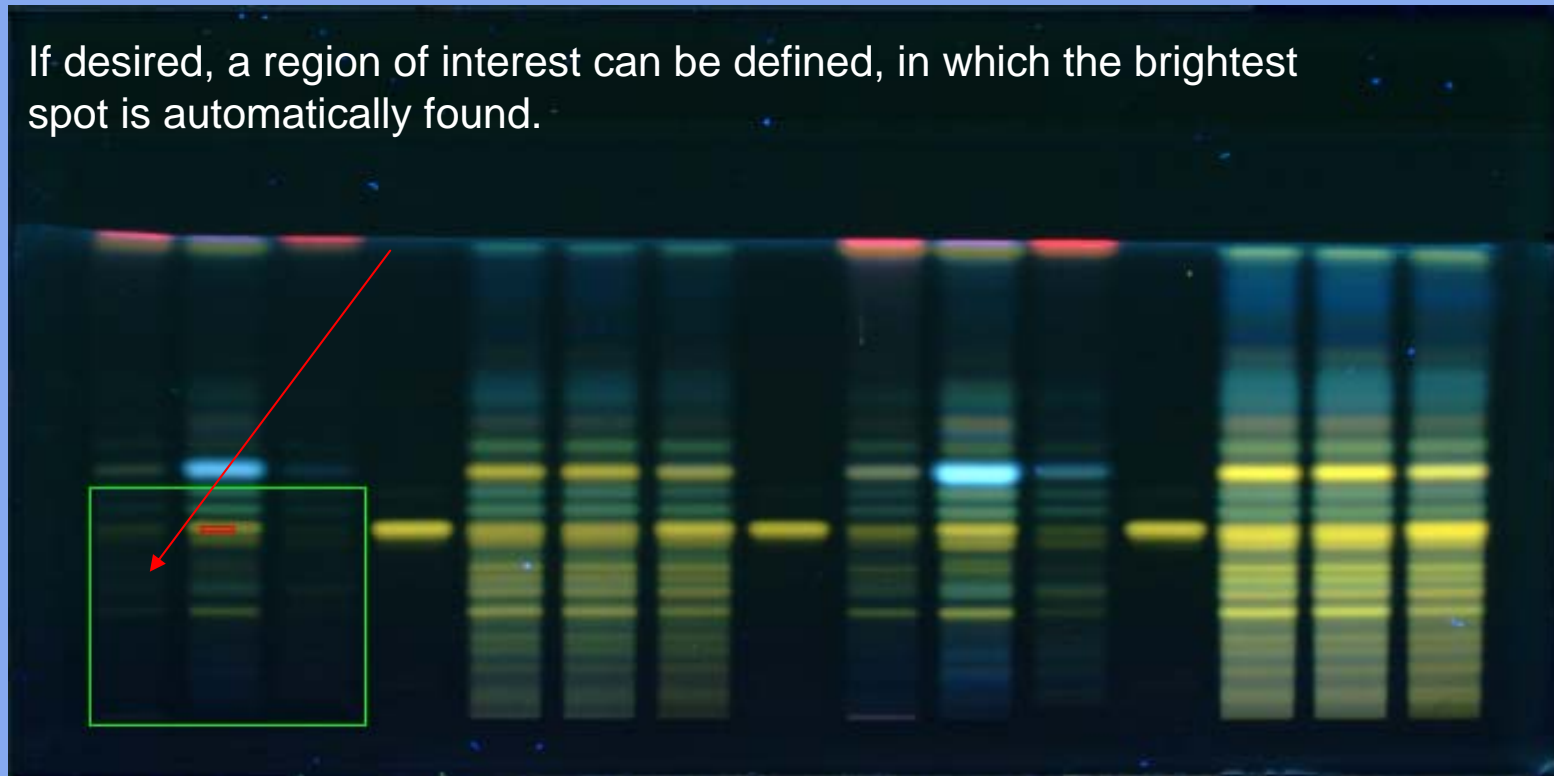
Camera adjusts for optimal illumination of the brightest spot



# Manual Optimization

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If desired, a region of interest can be defined, in which the brightest spot is automatically found.



# Manual Optimization

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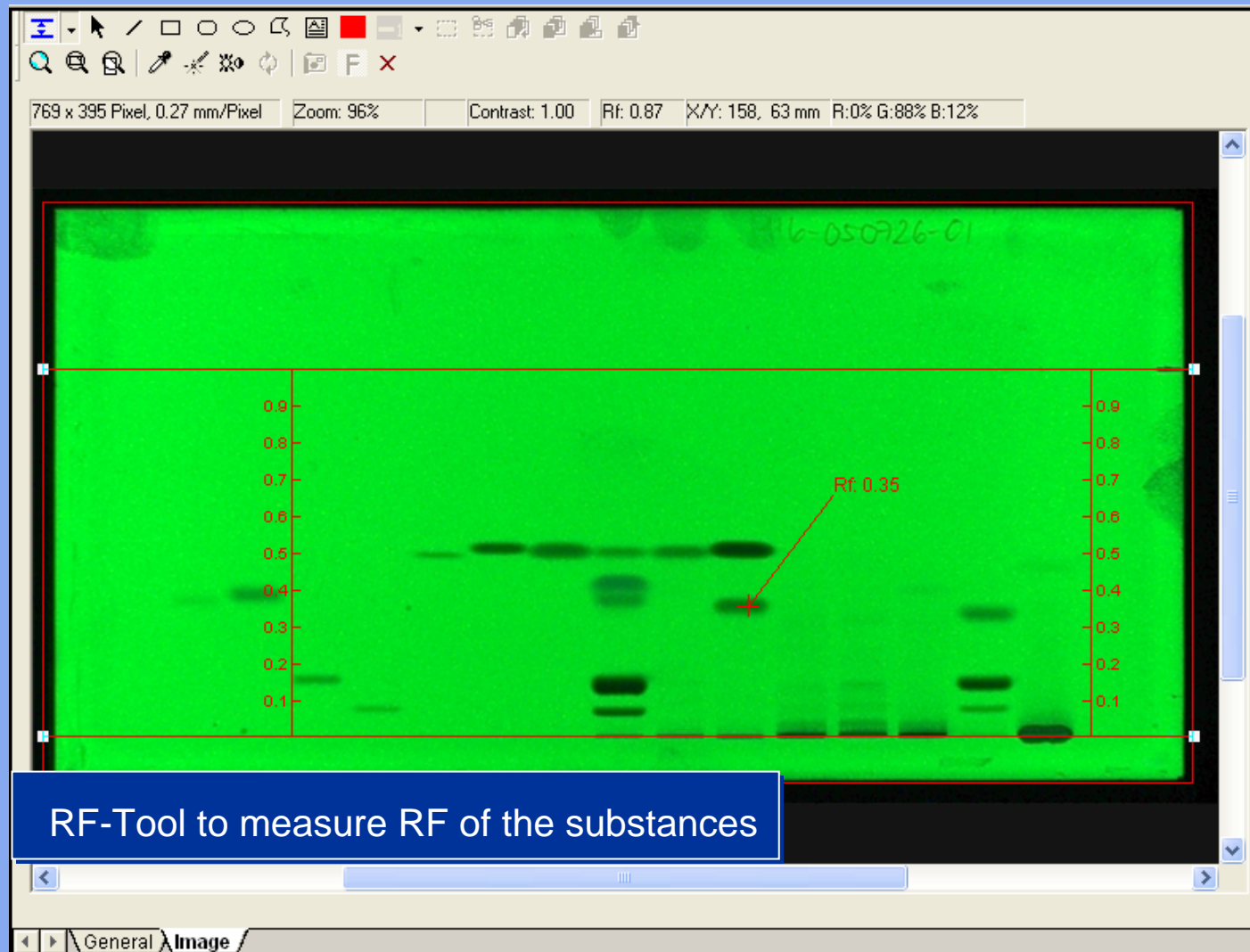
Camera adjusts for optimal illumination of the brightest spot in the region of interest





# winCATS with TLC Visualizer

CAMMAG

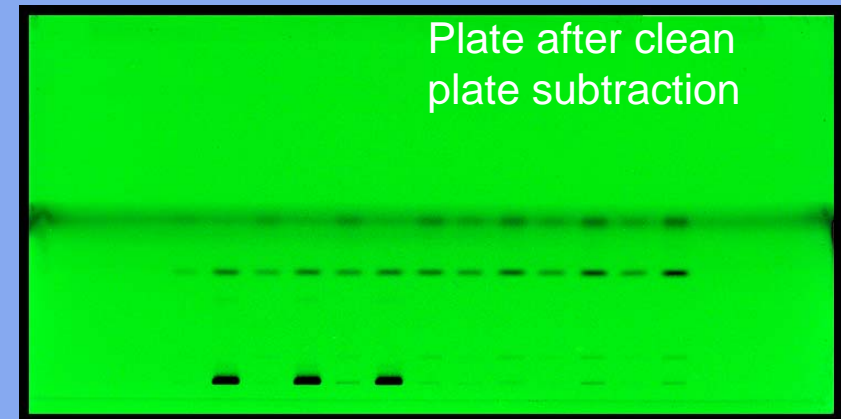
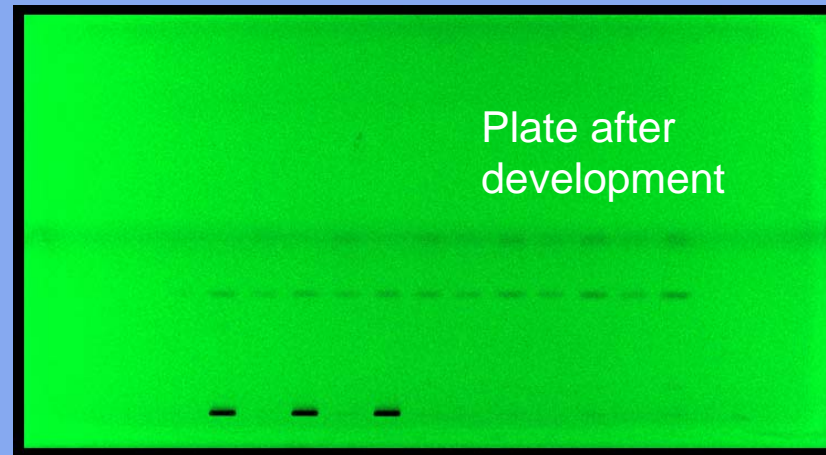
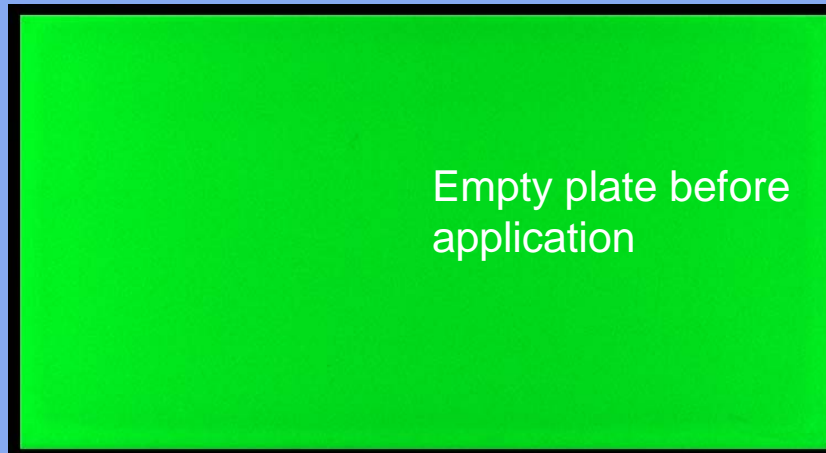


RF-Tool to measure RF of the substances



# Plate subtraction

**CAMMAG**



# TLC Visualizer / Image Comparison

CAMAG

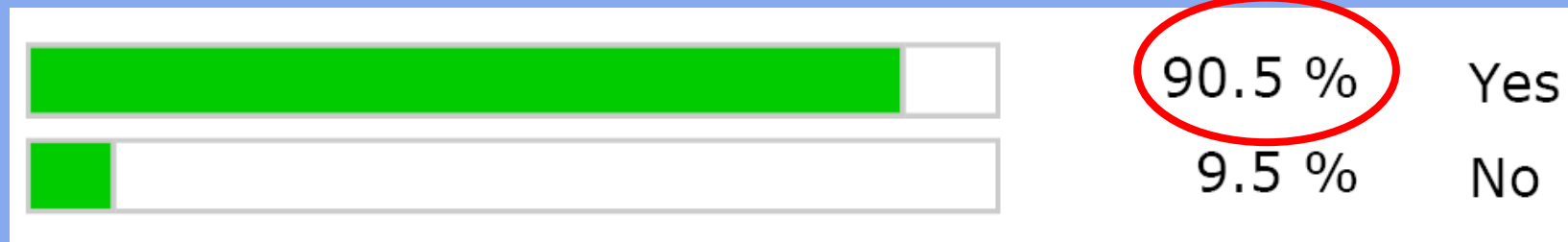
Show	Image	Refere...	Sample ID	Track	Source ID	Image ...	Author	Created at
<input checked="" type="checkbox"/>	0	<input type="checkbox"/>	Rheum officinale	1	C:\CAMAG\winC...	Image1	Daniel Handloser	29/11/2005 11...
<input checked="" type="checkbox"/>	9	<input type="checkbox"/>	Rhei sinensis	2	C:\CAMAG\winC...	Image1		
<input checked="" type="checkbox"/>	17	<input type="checkbox"/>	Rhei sinensis	2	C:\CAMAG\winC...	Image1		
<input checked="" type="checkbox"/>	1	<input type="checkbox"/>	Rhei sinensis	2	C:\CAMAG\winC...	Image1		
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<input checked="" type="checkbox"/>	2	<input type="checkbox"/>	Rheum palmatum	3	C:\CAMAG\winC...	Image1		
<input checked="" type="checkbox"/>	3	<input checked="" type="checkbox"/> isRef	Rheum rhaponticum	4	C:\CAMAG\winC...	Image1	Daniel Handloser	29/11/2005 11...
<input checked="" type="checkbox"/>	4	<input type="checkbox"/>	Rheum officinale	5	C:\CAMAG\winC...	Image1	Daniel Handloser	29/11/2005 11...

Image comparison viewer  
(single and multi plate)

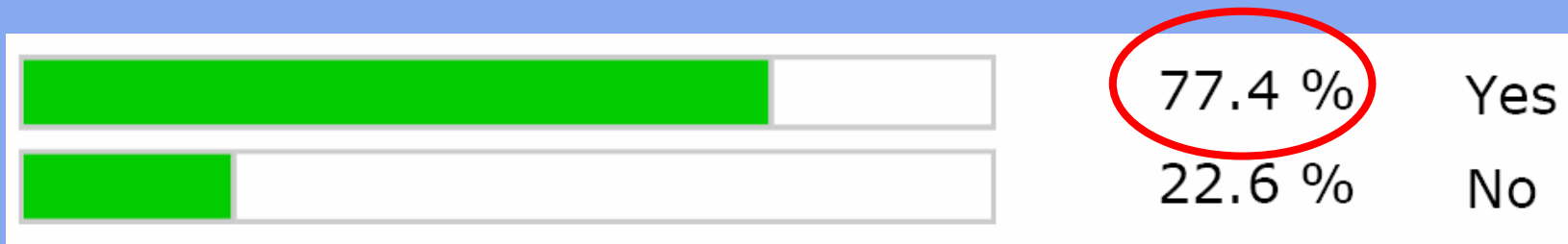
Tracks 19, 15, 3 (on the left)  
are used for reference

# Customer Survey TLC-MS

- Do you have samples which you can't analyze with LC-MS



- Are you interested in a TLC-MS solution?



## TLC-MS Coupling/TLC-MS Interface

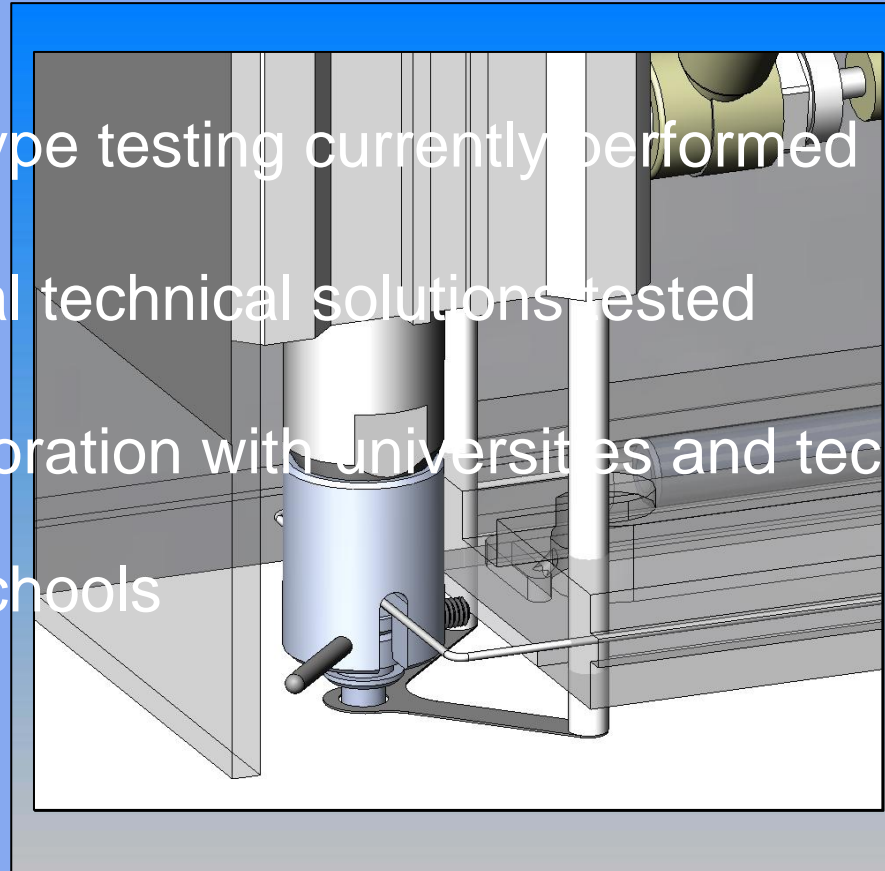
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- After this clear interest of the market CAMAG started TLC-MS coupling project
  - Easy and fast MS-analysis of TLC zones
  - Proved extractor principle of Dr. Luftmann (D)
- Semi automatic instrument involving:
  - Automatic plunger movement & force control
  - Automatic cleaning
  - Precise positioning
- TLC-MS Interface should be available for customers Q1 2009

## TLC-MS Coupling Interface

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- Prototype testing currently performed
- Several technical solutions tested
- Collaboration with universities and technical high schools



# Applications fields for Instrumental TLC/HPTLC

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 <p><b>Forensic</b></p> <ul style="list-style-type: none"><li>• Proof of document forgery</li><li>• Investigation of poisoning cases</li><li>• Color analysis</li></ul>	 <p><b>Environment</b></p> <ul style="list-style-type: none"><li>• Water</li><li>• Soil</li><li>• Air</li></ul>	 <p><b>Herbals</b></p> <ul style="list-style-type: none"><li>• Identification</li><li>• Stability tests</li><li>• Detection of adulteration</li><li>• Assay of marker compounds, etc.</li></ul>	 <p><b>Cosmetic</b></p> <ul style="list-style-type: none"><li>• Identity of raw material</li><li>• Preservatives, coloring materials, etc.</li><li>• Screening for illegal substances, etc.</li></ul>
 <p><b>Pharma</b></p> <ul style="list-style-type: none"><li>• Quality assurance of active and auxiliary materials as well as finished drugs</li><li>• Content assays</li><li>• Content Uniformity Test (CUT)</li><li>• Identity, purity tests</li><li>• Stability tests</li></ul>	 <p><b>Food/Feedstuff</b></p> <ul style="list-style-type: none"><li>• Quality control</li><li>• Additives (e.g. preservation materials, dyes, anti oxidants, emulsifiers, vitamins)</li><li>• Adverse (toxic) substances (e.g. mycotoxins, pesticides, veterinary drug residues)</li></ul>	 <p><b>Clinical Applications</b></p> <ul style="list-style-type: none"><li>• Lipids</li><li>• Metabolic studies</li><li>• Drug screening</li></ul>	 <p><b>Industrial Applications</b></p> <ul style="list-style-type: none"><li>• Process development</li><li>• Process control</li><li>• Cleaning validation</li></ul>

## Instrumental TLC/HPTLC Applications:

- Historically Pharma was the largest field
- Today there are many other applications fields
- We should promote Instrumental TLC/HPTLC in applications with advantages compared to other methods

# Cosmetics - New applications fields for Instrumental TLC

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**Instrumental TLC enables to analyze  
different substance classes from  
complex mixtures as:**

- Amino acids
- Ceramides
- Cholesterol
- Fatty acids
- Lipids
- Peptides
- Plant extracts
- Phospholipids
- Squalens
- Sugars
- Sterols
- Wax esters

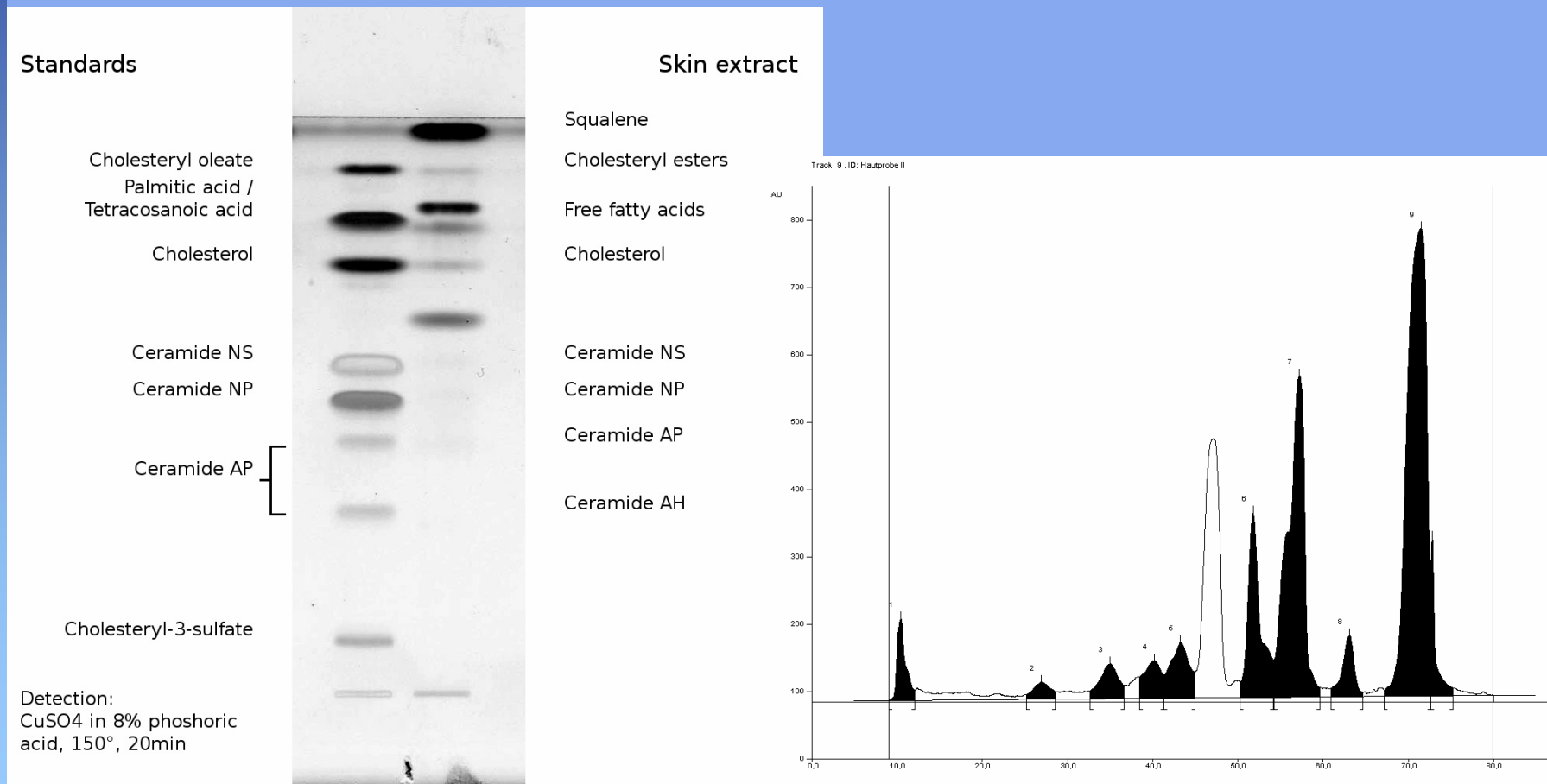
**Education of Cosmetic scientist in Instrumental TLC should be our  
goal to further establish the method in this field.**



# Cosmetics - New applications fields for Instrumental TLC

**CAMAG**

## Separation of various lipid components with Instrumental TLC:



H. Farwanah, R.H.H. Neubert, S. Zellmer, K. Raith, J. of Chromatogr. B, 780 (2) (2002) 443-450,  
Poster with improved procedure in preparation

# New applications fields for Instrumental TLC/HPTLC

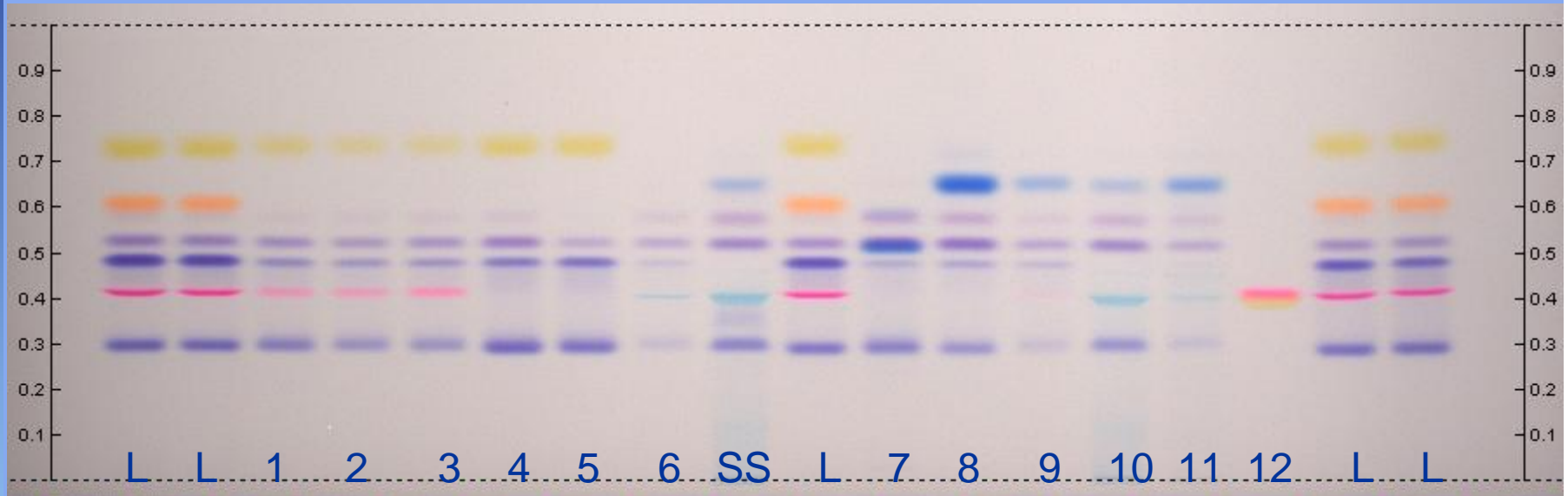
**CAMAG**



## Forensics/Ink Project with US Secret Service :

- CAMAG Laboratory has developed a method to analyze various ink types
- CAMAG has analyzed more than 8300 coded samples provided by the US Secret Service
- University Lausanne works on a intelligent database to identify type of ink at an investigation
- We aim that this database can be accessed from other Forensic Laboratories around the world

## Ink Project with US Secret Service



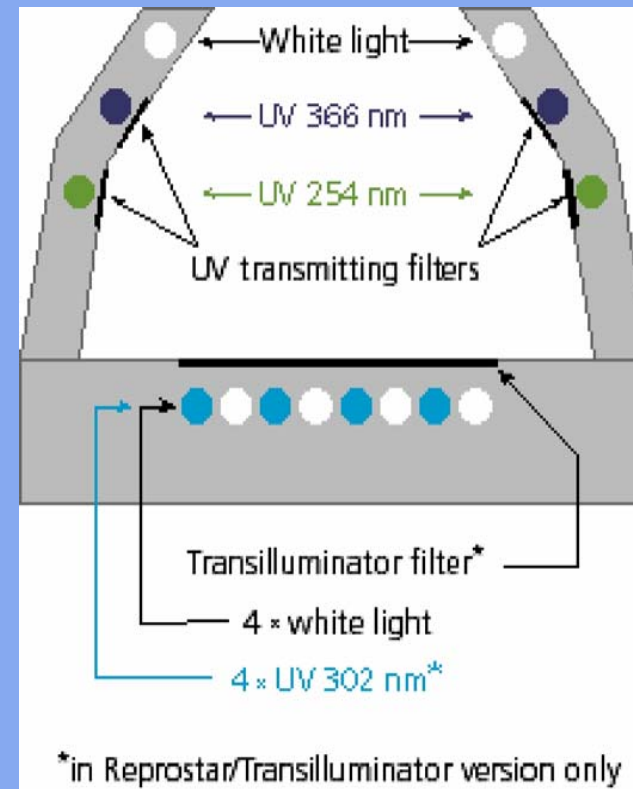
**L:** Ladder (Standard mixture)

**SS:** System suitability test

**1-12:** Various samples of ball point inks

- Thank you for your interest

# TLC Visualizer

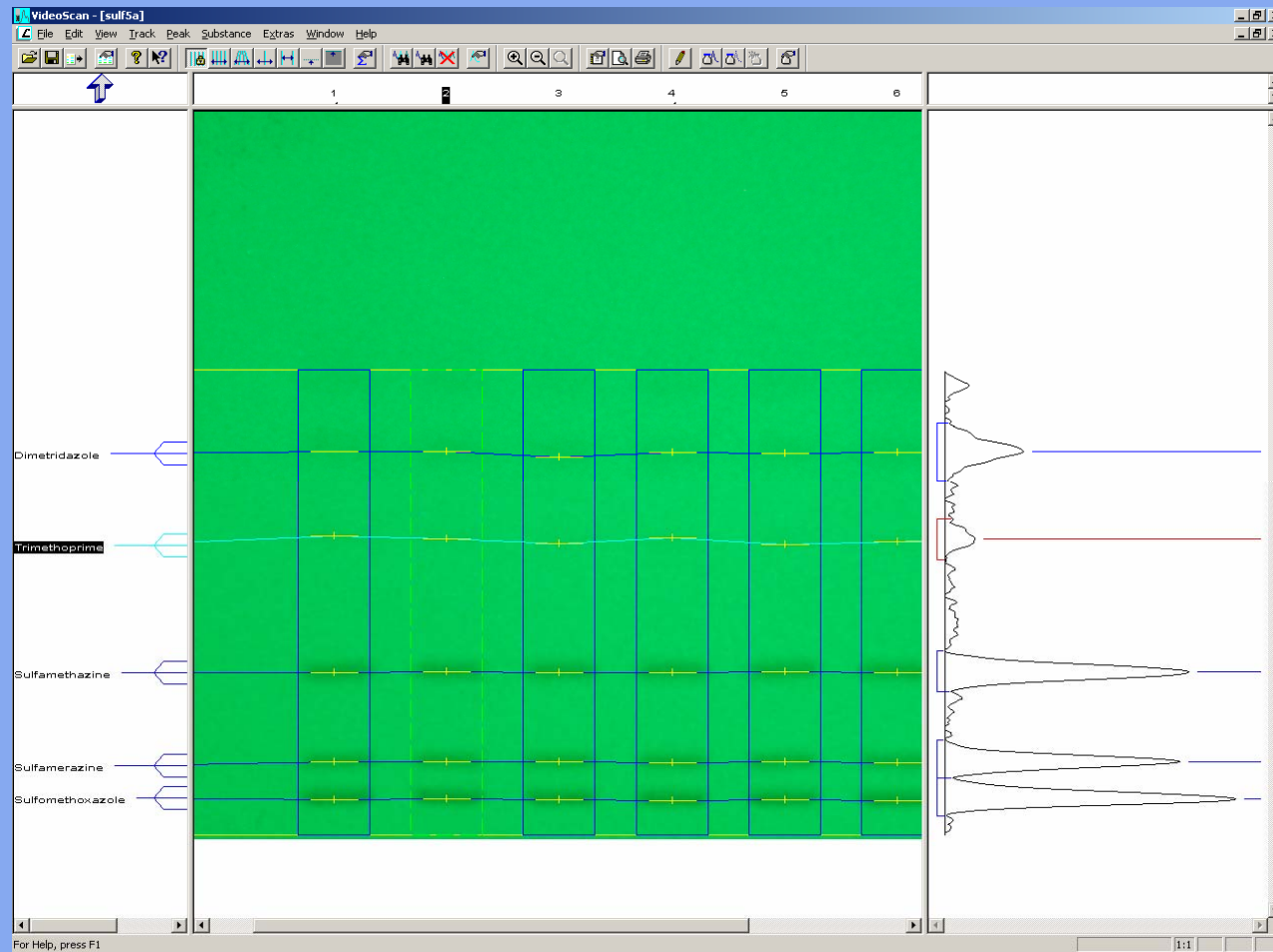


# VideoScan

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- Quantitative chromatogram evaluation
- Integration of all tracks
- Labeling all substances
- Quantitative report
- GMP - compliant

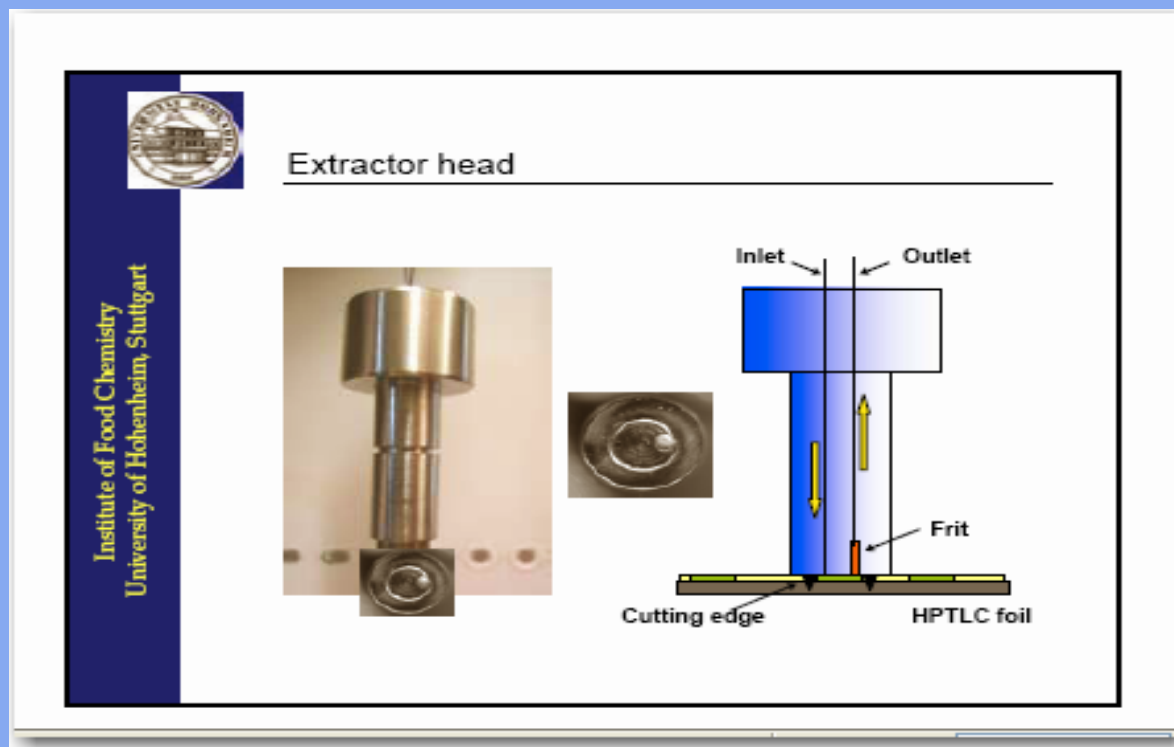
VideoScan — image pixel conversion → analog  
 curve





# Principle of TLC/MS Coupling

## HPTLC/ESI-MS



# Principle of TLC/MS Coupling

## Valve control

- Standby position

→ solvent bypasses extractor

- Extraction position

→ solvent passes extractor

