HPTLC-Bioluminescence-Detection with *Vibrio fischeri*

Method enhancements and its potential in the field of consumer goods

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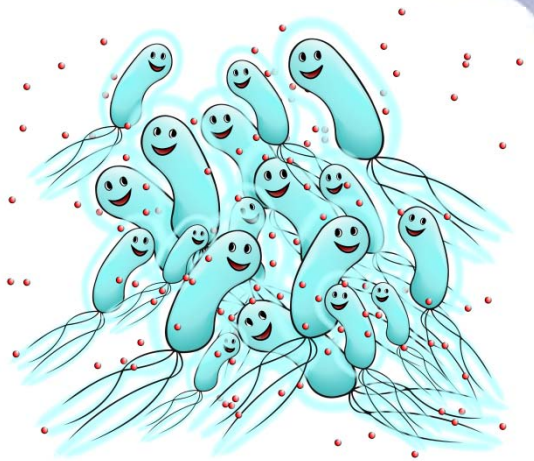
Brief description

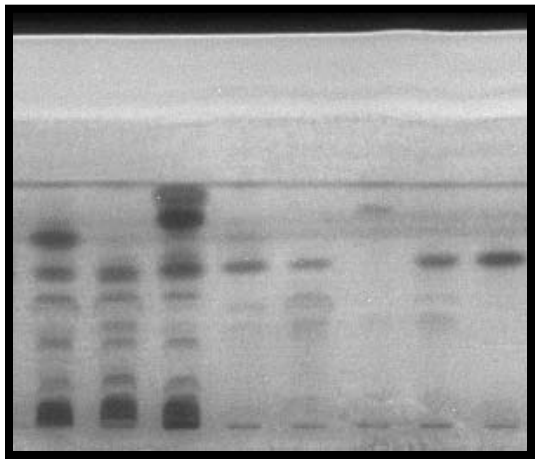


Aim:

- link physical-chemical detection with biological examination
- find substances with toxicological relevance

Principal:

- separation of a sample with HPTLC
- detection with *Vibrio fischeri*
- dark zones indicate bioactive substances
- qualitative, (semi)quantitative evaluation

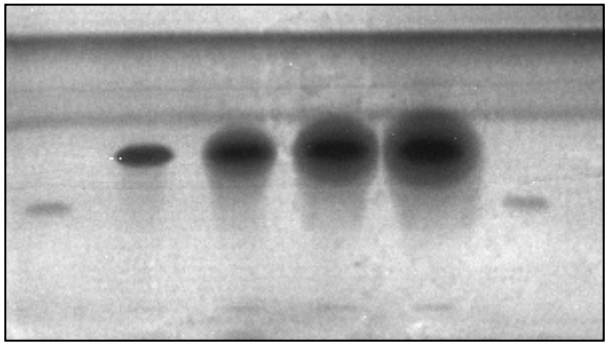


Application by Rolling

Application by Rolling

Problem:

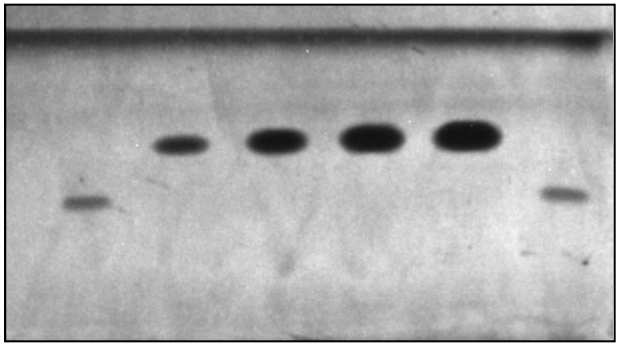
- dipping can lead to bleeding
- spraying not practicable



dipping

Improvement:

- sharper zones
- better contrast, “prettier” plates
- better chromatograms

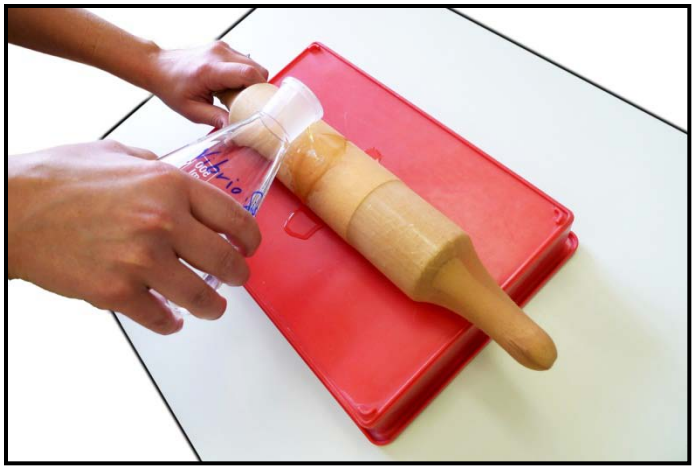


rolling

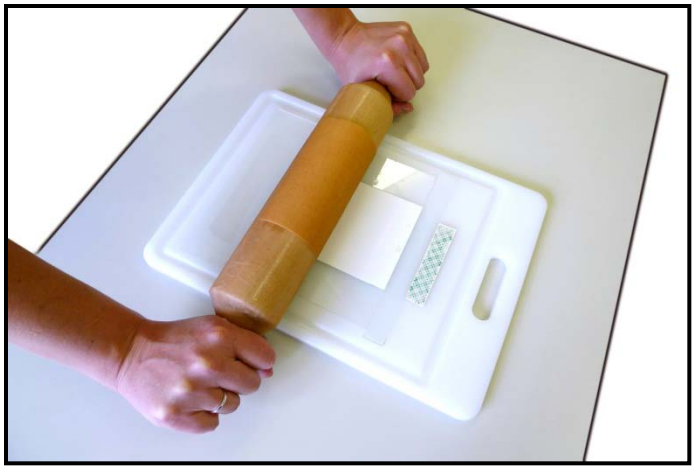
Application by Rolling

Manual performance

Rolling performed with household articles



application of bacteria



rolling over the plate

Application by Rolling

Automated performance

Rolling device has been constructed

(University of Applied Sciences Northwestern Switzerland)

Rolling

Examination of mouthwashes

Examination of mouthwashes

Claims related to antimicrobial effects:

What are the antimicrobial substances?

Are they: Declared? Hidden? Forbidden?

Approach:

No conventional detection is specific for antimicrobial activity.

→ *Vibrio fischeri* for screening and pre-separation

Examination of mouthwashes

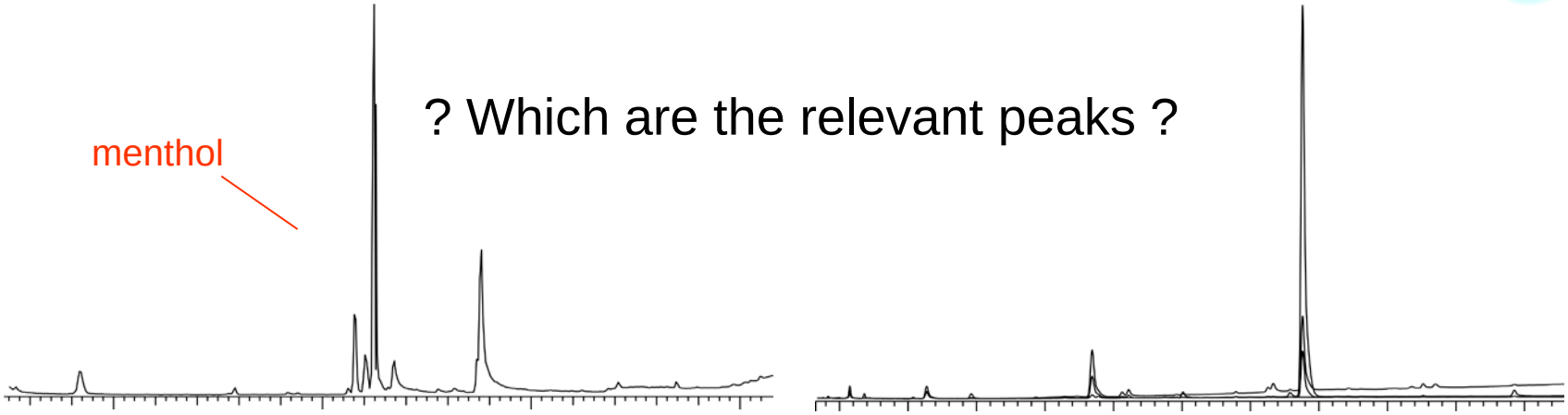
Workflow

1. application of sample
2. HPTLC separation
3. *Vibrio fischeri* detection
4. marking zones of interest
5. extraction with HPTLC-MS Interface into vial
6. HPLC-DAD, LC-MS and/or GC-MS

Examination of mouthwashes

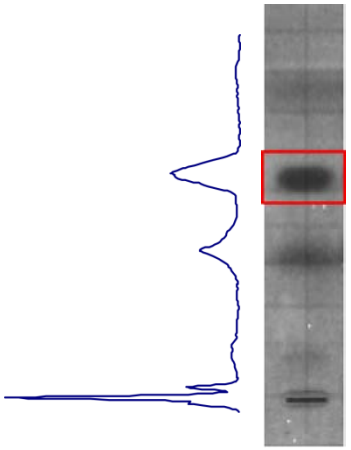
Example

? Which are the relevant peaks ?

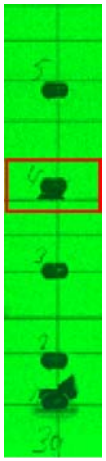


GC-MS

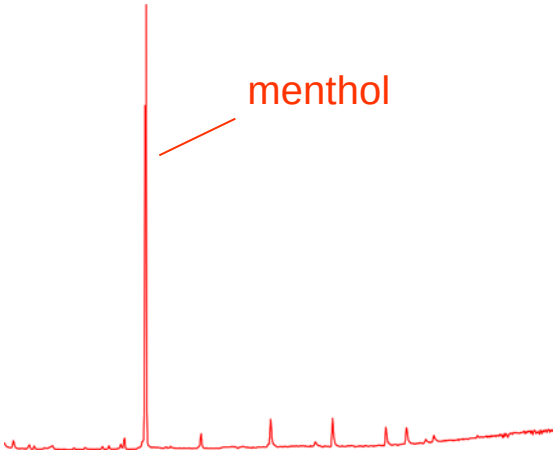
HPLC-DAD



biodetection



extraction



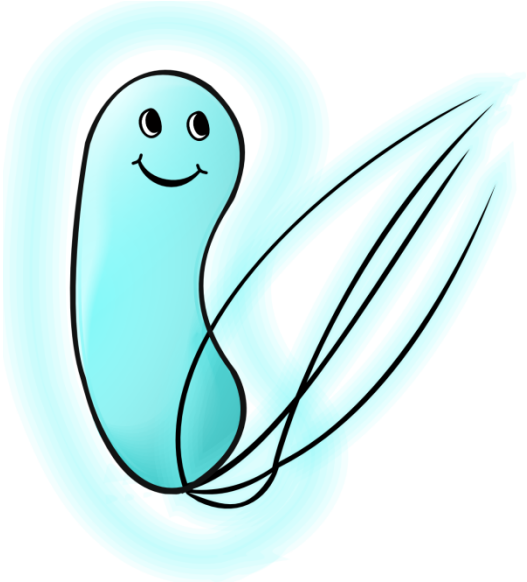
identification

Examination of mouthwashes

Results

- two-plate-system (amino, silica gel), peak-assignment via polarity
- positive identification of relevant substances with conventional detection
- in some cases active substances are hidden among “flavour/aroma”

Conclusions



Conclusions

Biodetection as guideline for GC/LC:

Indicates on which peaks to invest effort and time.

Achievements:

- effective quantitative evaluation
- improved application of bacteria
- link to conventional analysis

→ *Vibrio fischeri* biodetection is ready for use.


The End
(so far)