



Efficiency of a new device for application of reagents onto HPTLC plates or foils



Constanze Stiefel, Gerda Morlock, Wolfgang Schwack

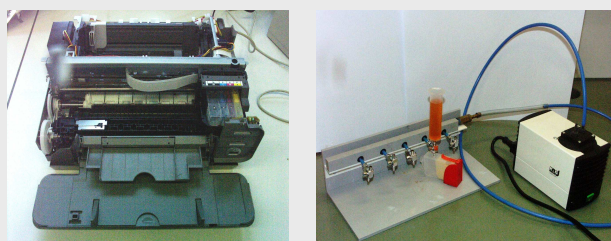
Institute of Food Chemistry, University of Hohenheim, Garbenstr. 28, 70599 Stuttgart, Germany, wschwack@uni-hohenheim.de

Introduction

Drop on demand printers are commonly used in daily life. A new kind of application is the combination with HPTLC. Its general employment as well as advantages and limitations of this new technique were investigated in this study.

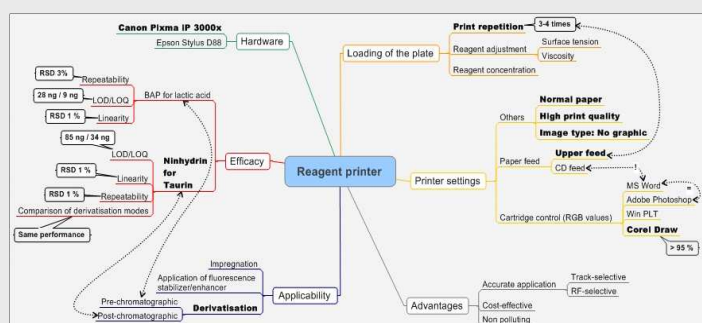
Results and discussion

Two different kind of printers were used, i.e. a piezo-electronic (Epson Stylus D88) and a bubble jet printer (Canon Pixma iP 3000x). For a better filling and exchange of the Canon cartridges the printer was completely uncovered.

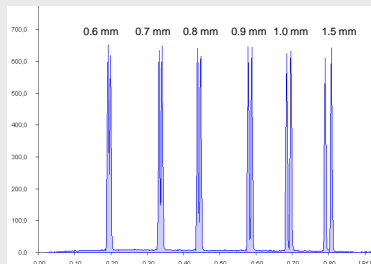


Modified Canon printer (left) and the equipment to fill the cartridges (right)

For using the printer in HPTLC different aspects were investigated and demonstrate the applicability.

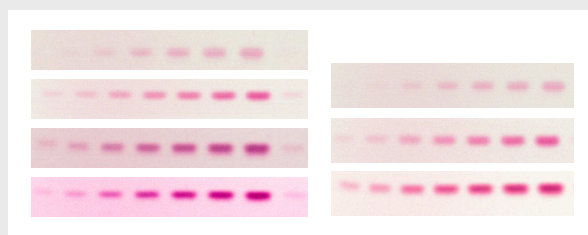


The spatial resolution of the Canon printer was ascertained to be 0.5 mm by visual inspection. By using the TLC Scanner 3 (CAMAG) a baseline separation was obtained for two lines printed at a distance of 1.5 mm.



Spatial resolution of the Canon Pixma iP 3000x, scanned by the TLC Scanner 3

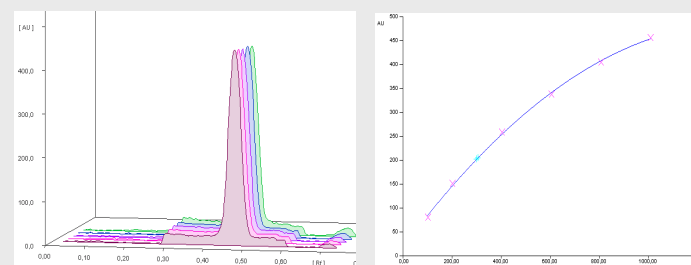
The reagent loading of the plate influenced the capability of detection.



The influence of different reagent concentrations (0.4, 0.8, 1.2 and 1.6 % ninhydrin solution, left) and of print repetitions (1, 3 and 5 times, right, both from top to bottom)

As an example for the post-chromatographic derivatisation taurin was detected with the ninhydrin reagent. For printing the reagent solution [1] was slightly modified to adjust the viscosity: 1.6 % ninhydrin was dissolved in ethanol – water – propylene glycol 35:15:4 (v/v/v).

The LOD of taurine was established to be 35 ng/zone. The RSD of the repeatability was $\pm 1\%$ (800 ng/zone taurine). The polynomial calibration showed a correlation coefficient of 0.9996. The recovery rate was $98\% \pm 2.8\%$ at 4 g/L (n = 2). The values obtained were as good as reported by [1].



Repeatability (RSD, n = 5) of the taurine standard (800 ng/zone each, fluorescence measurement at UV 525 nm) was $\pm 1\%$ (left); polynomial calibration (peak height, 0.1-1 μ g) of 'Red Bull' containing taurine with a correlation coefficient of 0.9996 (right)

Conclusion

The selective derivatisation of distinct areas on a plate, the immense spatial resolution and the low consumption of reagents are major advantages of this new application technique. Compared to a commercially available automated spraying device, the printer avoids the formation of aerosols and offers a homogeneous reagent transfer all over the plate and hence a good precision. However, a modification of the printer driver is necessary to obtain improved reagent output.

References:

[1] Aranda M., Morlock G.: Simultaneous determination of riboflavin, pyridoxine, nicotinamide, caffeine and taurine in energy drinks by planar chromatography-multiple detection with confirmation by electrospray ionization mass spectrometry. J. Chromatogr. A (2006) in press, DOI 10.1016/j.chroma.2006.07.018

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