Editorial

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Published online: 26 August 2021

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Dear Colleagues,

Last year, the Journal of Planar Chromatography (JPC) announced a special issue on “counterfeit drugs”. Faked medications or counterfeit drugs are packaged substances, from their appearance pretending to be genuine medicines. They are sold via the internet in increasing number. In my eyes, high-performance thin-layer chromatography (HPTLC) and thin-layer chromatography (TLC) are the obvious separation methods to detect counterfeit drugs. Both methods are fast working, inexpensive and sufficient in terms of separation performance to separate a small number of active ingredients in a drug.

The special JPC issue on “counterfeit drugs” was planned for the topics:

- fast and reliable analytical decision whether it is a genuine medicine or a fake;
- quantification methods for checking if the labelled content is correctly given;
- research on simplified methods which can be performed using a minimum of equipment;
- comparison between spectral information, staining reaction and R_F value as a tool of compound identification; and
- use of libraries for substance identification.

The feedback on this announcement was rather restrained, although the present JPC issue shows that the idea was not as wrong.

The actual JPC issue includes eleven original research papers of pharmaceutical analysis by TLC, written by leading scientists in this field. The issue starts with the work **“Development and validation of a high-performance thin-layer chromatography assay for the analysis of tacrolimus ointments”** from the group of *Cornelia Locher*.

Tacrolimus is a 23-membered macrolide lactone antibiotic separated on plate, stained with p-anisaldehyde reagent and analysed in fluorescence at 366 nm using an 8-bit camera. The authors summarize that “this study reports a simple, fully validated HPTLC protocol for the quantification of tacrolimus in ointment formulations. It demonstrates that the method can accurately quantify the drug content of the topical formulations without excipient interference or the necessity of a drug extraction step prior to analysis. The findings confirm that HPTLC is an accurate analytical technique, which offers good resolution between drug and excipients, high levels of sensitivity and excellent in situ quantification capabilities. Given the ease of sample preparation, HPTLC’s high-throughput capacity (with up to 15 samples per plate) and the flexibility of running qualitative and quantitative assays simultaneously, the approach should be considered a promising analysis technique for other pharmaceutical ointment formulations, in particular for highly lipophilic drugs which otherwise might necessitate drug extraction from the ointment base prior to analysis”.

The next paper is from *Monika Skowron, Robert Zakrzewski and Witold Ciesielski* and has the title **“Application of the TLC image analysis technique for simultaneous quantitative determination of L-proline and L-lysine in dietary supplement”**. For the simultaneous quantitative determination of L-proline and L-lysine in dietary supplement, a simple and sensitive TLC method was developed in combination with an image analysis technique with good precision and accuracy. After separation, the visualization of the chromatograms was performed by an iodine–azide reaction. The plates were scanned at 300 dpi using an inexpensive HP ScanJet G4010 8-bit office scanner, and then, the digital images of the TLC plate chromatograms were converted to peak chromatograms and analysed in absorption. The authors state that “the main advantage of the image analysis is its simplicity and low cost resulting from application of computer equipped with scanner and suitable software for quantification”.

The next paper entitled **“A validated quantification of triclosan in toothpaste using high-performance thin-layer**

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chromatography and a 48-bit flatbed scanner” by *Barbara Anders, Sabrina Doll and Bernd Spangenberg* uses the same principle and presents an analytical method for triclosan in toothpaste without pretreatment steps. Quantification is based on direct measurements of triclosan using an inexpensive 48-bit flatbed scanner for colour measurements (in red, green and blue) after plate staining with 2,6-dichloroquinone-4-chlorimide (*Gibbs’ reagent*). The authors state that “a 48-bit flatbed scanner is a truly high-tech tool. It is commercially available at a very low price (105 €) and makes HPTLC analysis a fully quantitative method without compromising its simplicity”.

The paper **“Different approaches in thin-layer chromatography for enantioresolution of acebutolol using colistin sulfate as chiral selector”** by *Vinod Kumar Vashistha et al.* describes the enantioresolution of (RS)-acebutolol by TLC involving colistin sulfate as chiral selector. After separation, (RS)-acebutolol was stained by iodine. The method can also be used for quantification in combination with a camera or flatbed scanner. All these papers demonstrate that TLC, in combination with plate staining prior to plate scanning, provides a reliable, cost-effective and robust method for the quantification of pharmaceuticals using minimal equipment.

The work **“A validated HPTLC method for quantification of cordifolioside A, 20- β -hydroxyecdysone and columbin with HPTLC–ESI–MS/MS characterization in stems of *Tinospora cordifolia*”** by *Kalpna Patel et al.* uses ultraviolet (UV) scanning at 210 nm in conjunction with mass spectrometry (MS). The TLC–MS interface technique was used for the separation of cordifolioside A, 20- β -hydroxyecdysone and columbin from *T. cordifolia* extract.

The following work by *Pintu Prajapati, Maria Patel and Shailesh Shah* describes the simultaneous estimation of chlorthalidone and metoprolol succinate. Scanning of the bands was performed using a TLC scanner at 230 nm without staining. The title is: **“A robust high-performance thin-layer chromatography method for the simultaneous estimation of chlorthalidone and metoprolol succinate using quality risk assessment and design of experiments-based enhanced analytical quality by design approach”**.

The topic of the next two papers is the analysis of two active pharmaceutical ingredients and their degradation products. These are the papers **“Study of the degradation behavior of dapagliflozin propanediol monohydrate and metformin hydrochloride by a stability-indicating high-performance thin-layer chromatographic method”** written by *Jasmina Shivilal Surati and Vandana B. Patel*, and **“Stability-indicating high-performance thin-layer chromatography method for the simultaneous estimation of emtricitabine and tenofovir alafenamide fumarate”**, written by *Arun M. Kashid and Rohini R. Kadam*.

The analysis of a single pharmaceutical substance including the analysis of degradation products is described in the last three papers: **“High-performance thin-layer chromatography method for the quantification of quetiapine fumarate and its related genotoxic impurities using green solvents”** from the group of *Pankaj B. Miniyar*, **“A rapid and highly sensitive stability-indicating high-performance thin-layer chromatography technique for the determination of tedizolid phosphate with a classical univariate calibration”** by *Prawez Alam et al.* and **“Development of a specific and sensitive high-performance thin-layer chromatography assay method for the determination of linagliptin in tablet dosage form”** by *V. P. Rode and M. R. Tajne*. All these works were done using TLC scanners that measure in the UV range.

Pharmaceutical preparations rarely consist of more than three active ingredients. This makes TLC or HPTLC the method of choice for the analysis of pharmaceutical preparations. In particular, the combination of planar chromatography, plate staining and evaluation using modern image technology is very interesting. It should be used more in the future, especially in the field of “drug counterfeiting”.

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(Editor-in-Chief)

Funding Open Access funding enabled and organized by Projekt DEAL.

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