

A NEW ALTERNATIVE FOR QUANTITATIVE ANALYSIS IN THIN LAYER CHROMATOGRAPHY USING A MULTI-TRACK DEVICE AND IMAGE-BASED CHROMATOGRAMS

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The present work describes an alternative method to construct Thin Layer Chromatography (TLC) plates, the development of a software to obtain chromatograms based on digital images (captured by a webcam) and the evaluation of the proposed strategy in the determination of Caffeine (CAF), Acetaminophen (ACM) and Acetylsalicylic acid (ASA) in medicine tablets.

In an aluminum plate with dimensions of 100mm×80mm×10mm (l×w×h), eight tracks (95mm x 60mm x 1.0mm) were machined to provide thin reservoirs for deposition of 0.7mL of a suspension prepared by mixing 10g of silica TLC 60 GF₂₅₄ and 35mL of distilled water. Drying and activation of the silica on the tracks were performed in a laboratory oven at 120 °C for 3h. Image-based measurements were performed in a controlled UV (254nm) radiation environment specially developed for this purpose. To detect the separated bands of the analytes, a software was written in VisualStudio 2013 to acquire the image of the plate (Fig. 1(B)) and the RGB signals in real time for the eight chromatographic channels by scanning pixel by pixel only of the regions of interest of the image. Analytical curves were obtained for the analytes based on the chromatographic peak heights (Fig. 1(A)), providing linear relationships ($R > 0.996$) for the studied concentration ranges ACM (0.18–0.54mgmL⁻¹), CAF (0.50–3.00mgmL⁻¹) and ASA (0.70–4.50mgmL⁻¹) with estimated limits of detection (LOD) of 0.14mgmL⁻¹, 0.40mgmL⁻¹ and 0.56mgmL⁻¹, for ACM, CAF and ASA, respectively. In addition, no significant differences (95% confidence level) were observed by comparing the average concentration of the analytes determined by the proposed method and those obtained by a reference HPLC based method, indicating an adequate accuracy of the procedures.

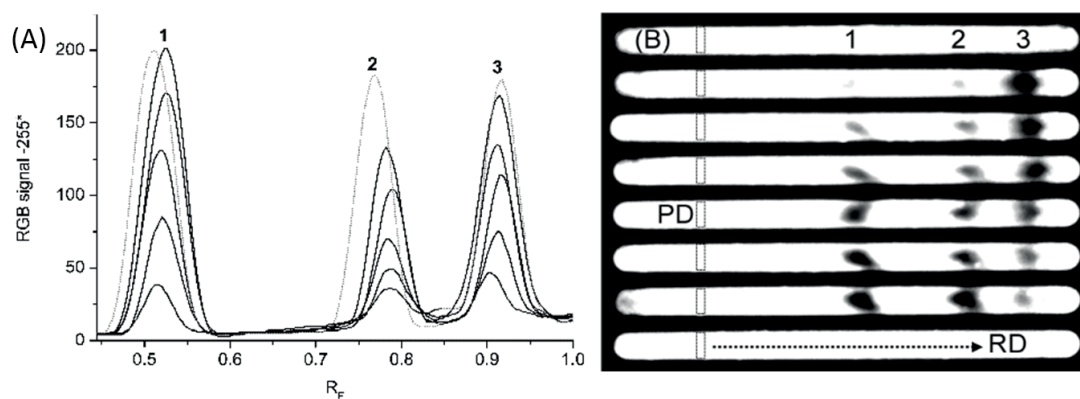


Figure 1. Figure 1. (A) Image-based chromatograms acquired and (B) image acquired for multi-track device with CAF (1), ACM (2) and ASA (3).