

THE THIN LAYER CHROMATOGRAPHY APPLICATION FOR IDENTIFICATION OF CIPROFLOXACINE AND ECONAZOLE IN COMBINATION

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Introduction

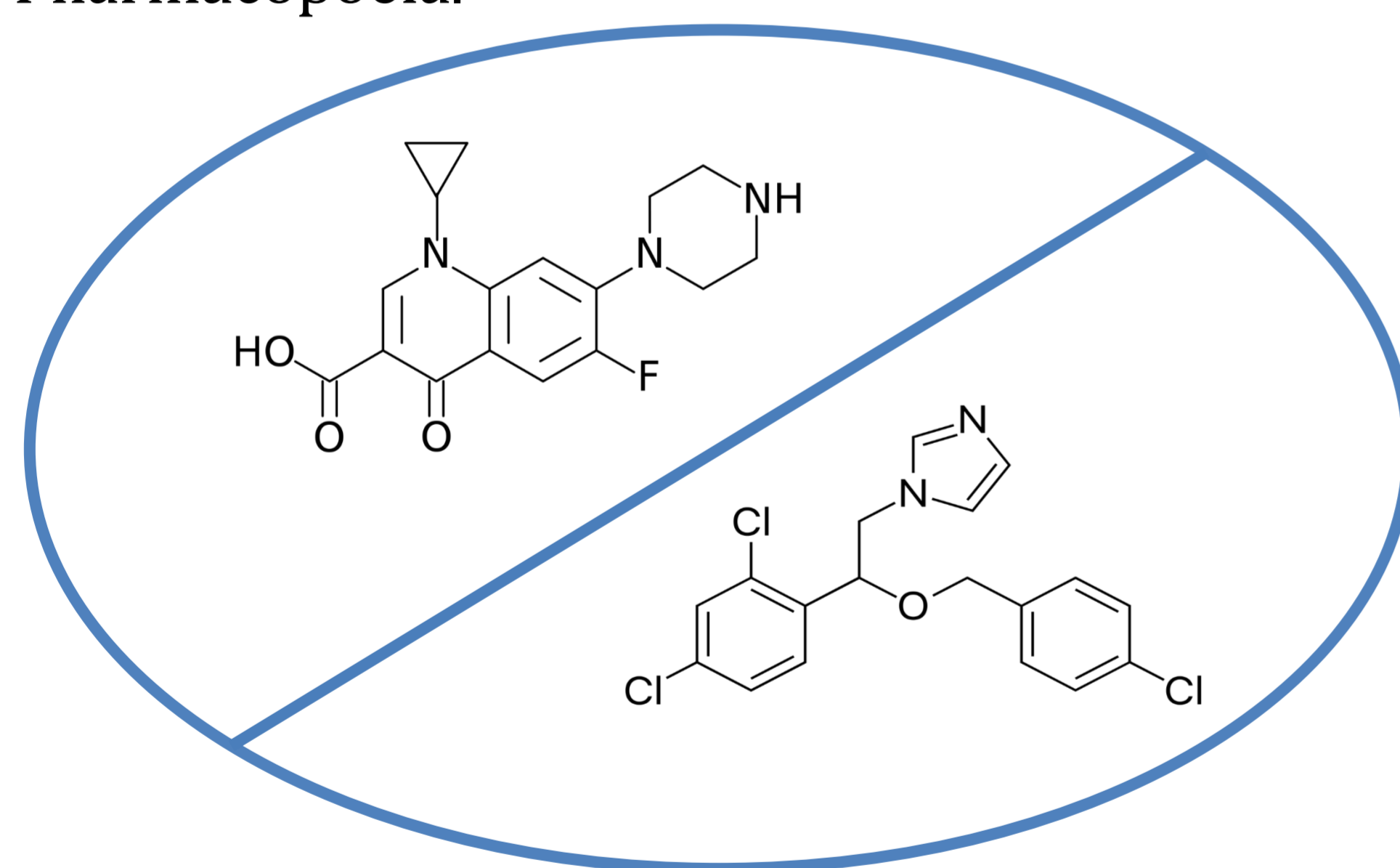
Thin layer chromatography (TLC) allows the separation of substances from the mixture and has been used for the analysis of the combination of ciprofloxacin (antimicrobial from the fluoroquinolone group) and econazole (antifungal, imidazole derivative).

Purpose

Separation and identification of ciprofloxacin and econazole in combination by TLC, selection of suitable solvents for the detection of both substances in combination.

Material and methods

Pharmaceutical substances ciprofloxacin hydrochloride and econazole nitrate (Sigma Aldrich, USA), chromatographic plates "Silufol", chromatography chamber, solvents, reagents according to the European Pharmacopoeia.



Results

Of the 28 chromatographic systems with different polarity investigated, the solvent mixture Methanol: Acetonitrile (40:60) is the optimal mobile phase for both substances, as it forms well-defined spots and achieves a good separation of components. After chromatography, the plates were sprayed with Dragendorff reagent and examined in UV light at a wavelength of 254 nm (fluorescence and yellow-orange spots). For ciprofloxacin hydrochloride $R_f = 0.32$, and for econazole nitrate $R_f = 0.77$.

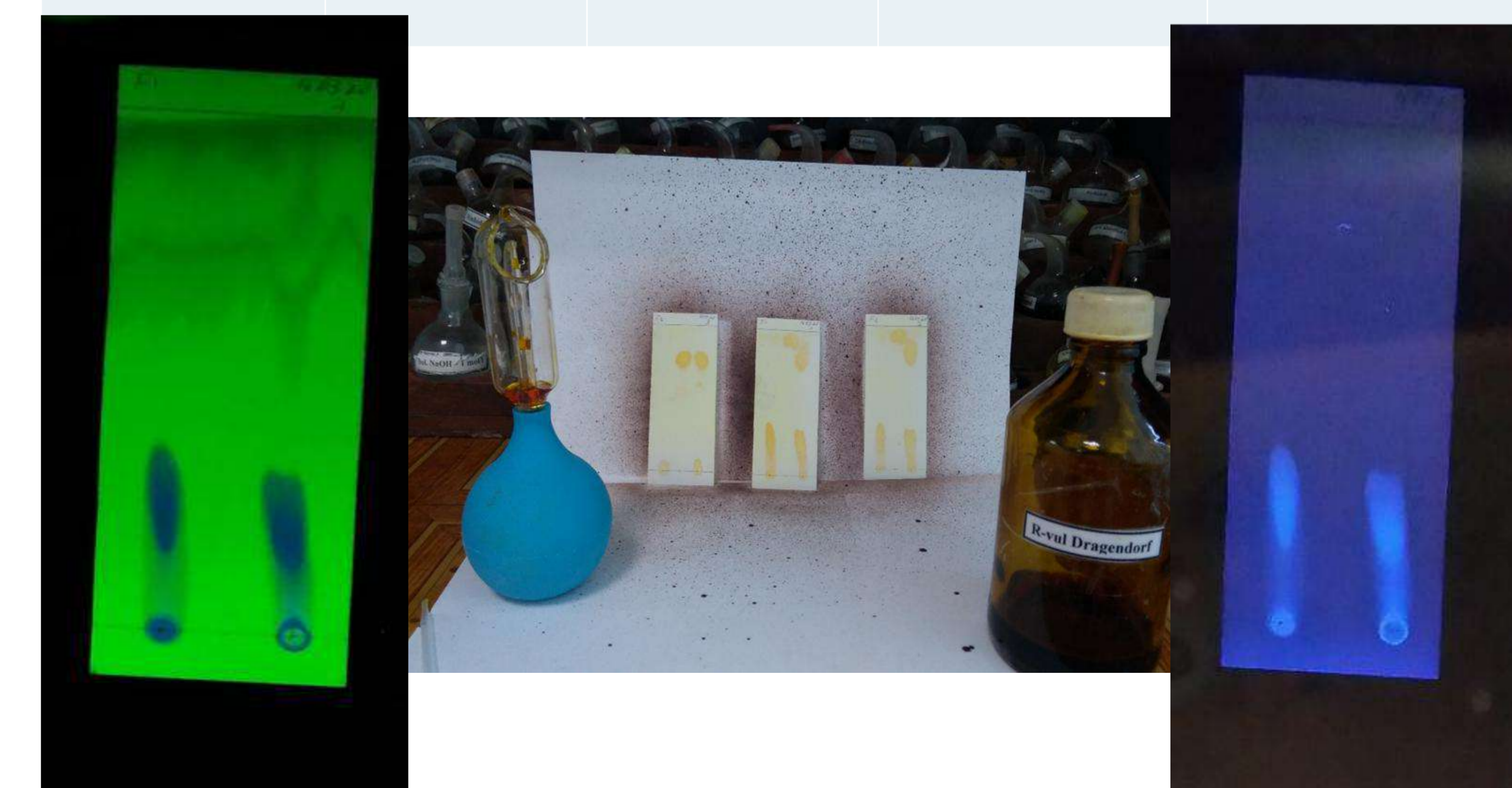
Keywords: Thin layer chromatography, ciprofloxacin hydrochloride, econazole nitrate

Table 1. Selection of the optimal development system

Mobile phase	Method of disclosure/detection	Ciprofloxacin hydrochloride	Econazole nitrate
Hexane: CHCl ₃ :MeOH: NH ₃ - 25% 60:30:10:1	Spray with iodine solution in chloroform	Scattered spots; $R_f=0,1$	Indeterminate spots
Acetonitrile: NH ₃ -25%-MeOH:CH ₂ Cl ₂ 10:20:40:40	Examination UV wavelength at 254 nm	Poorly contoured spots; $R_f=0,6$	Poorly contoured spots; $R_f=0,85$
Methanol: Acetonitrile 50:50	Examination UV wavelength at 254 nm	Well shaped spots; $R_f=0,33$	Well shaped spots, econazole migration too fast; $R_f=0,92$
Methanol: Acetonitrile 40:60	Examination UV wavelength at 254 nm. Spray with Dragendorff reagent solution.	Well shaped spots; $R_f=0,32$	Well shaped spots, good separation $R_f=0,77$
CH ₂ Cl ₂ : Methanol: Propanol: NH ₃ - 25% 4:4:5:2	Examination UV wavelength at 254 nm.	Determined spot; $R_f=0,47$	Undetermined spot
CH ₂ Cl ₂ : Methanol: 2-Propanol:NH ₃ - 25% 2:2:5:2	Examination UV wavelength at 254 nm	Determined spot; $R_f=0,62$	Undetermined spot
CHCl ₃ : Methanol:2-Propanol:NH ₃ - 25% 4:2:5:1	Examination UV wavelength at 254 nm	Weakly contoured spot; $R_f=0,14$	Undetermined spot

Table 2. Results of analysis by thin layer chromatography of substances in mechanical mixture and pharmaceutical form

Mobile phase	Mechanical mixture(1:1)		Pharmaceutical form	
	Ciprofloxacin hydrochloride	Econazole nitrate	Ciprofloxacin hydrochloride	Econazole nitrate
Methanol: Acetonitrile 40:60	Well shaped spots, UV fluorescence and yellow-orange coloration on development with Dragendorff reagent, $R_f = 0,32$	Well shaped spots, good separation; UV fluorescence and orange-yellow color on development with Dragendorff reagent. $R_f=0,87$	Well shaped spots, UV fluorescence and yellow-orange coloration on development with Dragendorff reagent. $R_f = 0,30$	Well shaped spots, good separation; UV fluorescence and orange-yellow color on development with Dragendorff reagent. $R_f=0,77$



Conclusions

The working technique developed for the separation of ciprofloxacin and econazole in combination by TLC can be used to identify substances in the same pharmaceutical form.

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